eBike / eBike L / eBike EL

Service Manual

2018112-003 Revision I

GE Medical Systems
Information Technologies

gemedicalsystems.com

Caution:
During repairs/service interventions, observe the protective measures against damage due to ESD.

- GE Medical Systems *Information Technologies* GmbH considers itself responsible for the effects on safety, reliability, and performance of the equipment, only if:
  - assembly operations, extensions, readjustments, modifications, or repairs are carried out by GE Medical Systems *Information Technologies* GmbH or by persons authorized by GE Medical Systems *Information Technologies*,
  - the electrical installation of the relevant room complies with the applicable national and local requirements, and
  - the instrument is used in accordance with the instructions for use.
- This manual contains service information; operating instructions are provided in the operator's manual of the instrument.
- This manual is in conformity with the instrument at printing date.
- All rights are reserved for instruments, circuits, techniques, and names appearing in the manual.

The Service Manual **eBike** is valid for the following devices:

2017911-001	ERGOMETER EBIKE BASIC PC-CTRL
2017911-002	ERGOMETER EBIKE BASIC PCPLUS-CTRL
2017911-003	ERGOMETER EBIKE BASIC PC-CTRL & BP
2017911-004	ERGOMETER EBIKE BASIC PCPLUS-CTRL & BP
2017911-005	ERGOMETER EBIKE COMFORT PC-CTRL
2017911-006	ERGOMETER EBIKE COMFORT PCPLUS-CTRL
2017911-007	ERGOMETER EBIKE COMFORT PC-CTRL & BP
2017911-008	ERGOMETER EIBKE COMFORT PCPLUS-CTRL&BP
2017911-020	ERGOMETER EBIKE L 240V
2017911-021	ERGOMETER EBIKE L & BP 240V
2017911-022	ERGOMETER EBIKE L EXT TRMNL 240V
2017911-023	ERGOMETER EBIKE L & BP EXT TRMNL 240V
2017911-024	ERGOMETER EBIKE L 120V
2017911-025	ERGOMETER EBIKE L & BP 120V
2017911-026	ERGOMETER EBIKE L EXT TRMNL 120V
2017911-027	ERGOMETER EBIKE L & BP EXT TRMNL 120V
2017911-028	ERGOMETER EBIKE EL 240V
2017911-029	ERGOMETER EBIKE EL & BP 240V
2017911-030	ERGOMETER EBIKE EL EXT TRMNL 240V
2017911-031	ERGOMETER EBIKE EL & BP EXT TRMNL 240V
2017911-032	ERGOMETER EBIKE EL 120V
2017911-033	ERGOMETER EBIKE EL & BP 120V
2017911-034	ERGOMETER EBIKE EL EXT TRMNL 120V
2017911-035	ERGOMETER EBIKE EL & BP EXT TRMNL 120V

optional with **Module "N I B P**" and all Supply and Service Items

and Software Version **FW 1.8**

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Revision History

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For your notes

A-1. Safety Information

Electrical Safety During Service Interventions (IEC 60601-1)

IEC 60601-1 requirements must be satisfied during repair, modifications and inspections of medical electrical equipment.

Under the regulations of the product liability act, equipment manufacturers must ensure that their product does not present any hazard to the user in normal use.
The potential hazards must be considered in particular when handling mains operated devices.
To ensure that equipment functions faultlessly and without presenting any hazard after service interventions, it must be subjected to the test procedures stipulated for the different device categories.

Requirements for Persons stipulated in the German Medical Device Operators Ordinance:

The requirements of §11 section 6, §11 section 5 sentence 1 and §6 section 4 of the MPBetreibV (German Medical Device Operator Ordinance) must be satisfied.

The regulations about handling **ESD sensitive components** must be observed.

1. Protection class I equipment (connected to protective earth conductor)

max. resistance of the protective earth conductor

R protective earth conductor (with connection cable with max. length of 5 m)	**0.100 Ohm**

max. equivalent enclosure leakage current for portable equipment.

max. equivalent enclosure leakage current	**0.500 mA**

The measuring equipment used for the tests must be inspected and calibrated at regular intervals. As per the German Medical Device Operator Ordinance, the measurement results must be documented in the medical device book.

Note

Suitable common ground terminal:

- Bicycle ergometer eBike Basic / Comfort: screw of the levelling device
- Ergometer eBike L/EL: screw head of the protective earth connection between swivelling section and ergometer base

A device is considered to be unsafe, when

- it cannot be repaired
- the user does not wish to have the device repaired. In this case, the operator must be informed in writing of the hazard presented by the device. The same remark must be annotated on the service report and on the service invoice.

Important information for service interventions:

- Use **original spare parts** only.
- For information about product changes, refer to the manufacturer's original documentation only.
- Observe the fuses' original ratings, characteristics and Ampere interrupting capacity.
- Parts of the device that ensure its safe operation must be neither damaged nor obviously unsuitable. This applies to insulation and insulating components in particular.
- Power cords must be visually inspected for signs of damage before connecting them to the power line.

Inspection according to German Medical Device Operator Ordinance:

- **Technical Safety Inspections and Inspections of the Measuring Systems:**

According to §6 and §11 of the German Medical Device Operator Ordinance, the load unit must be inspected to the approved rules of the art at intervals of 2 years by a *GE Medical Systems Information Technologies* authorized Service technician, and repaired if necessary.
The measurement results must be documented in the medical device book.

According to the German Medical Device Operator Ordinance, the next due inspection is indicated on the Test Sticker next to the ergometer's nameplate.

If unauthorized personnel opens the control terminal, destroying the calibration sticker (production date), any warranty claim shall become void.

- **Maintenance:**

Depending on the application purpose, all clamping levers of the device must be inspected at intervals of 6 months to check that the thread and tip of the clamping lever are adequately greased. If necessary, the clamping levers must be greased.
We recommend using a universal high-performance lubricant such as OKS 470.

Note

§11 of the German Medical Device Operator Ordinance demands that ergometers used in medicine, i.e., ergometers for exercising patients with a defined and reproducible physical load, be calibrated with a dynamic load.

The technical inspection of the measuring system is not required for ergometers used for training purposes only and where the tests are not documented. The restricted applicability must be identified by a suitable marker on the ergometer and it must be documented in the medical device book.

Automatic Sphygmomanometer
Calibration instructions for the NIBP module can be found in the Servicing Instructions. Follow these instructions to display the BP values with the test setup according to DIN EN 1060-1 and DIN EN 1060-3.

Ergometer
Static and dynamic inspections of the ergometer must be performed according to DIN VDE 0750-238.

A-2. Final Checkout Procedure / Functional Test

These tests must be performed as the final checkout and test procedure after every safety inspection, maintenance and repair of the product.

A-2.1. Final Checkout Procedure and Functional Test of eBike Basic, eBike Comfort

1. Visually inspect the device

- Inspect coat of lacquer, cables/power cord, bellows on steering column and saddle.
- Inspect cuff, tubing and tubing connection.
- Check the setup for stability, adjust with levelling device if required.

Expected result: No damage, instability or wear detected Pass/Fail

2. Check cranks, pedals and Velcro strips

- Cranks, pedals and Velcro strips properly fixed.
- Grease the threads of the clamping levers (every 6 months, depending on application purpose).

Expected result: All threads properly greased, cranks and pedals OK Pass/Fail

3. Power on

- Using the power cord, connect the device to the power line and turn it on with the power switch.
- Wait for self-test to end: Check LCD, e.g. for error messages.
- Check in the software if the firmware version is OK.

Expected result: Device powers on without errors and FW is OK Pass/Fail

4. Adjustments

eBike Basic:

- Check saddle (height) and handlebar (angle) adjustment.
- Check that the clamping levers (saddle (height) and handlebar (angle) adjustment) are tight.

eBike Comfort:

- Check electrical saddle adjustment: adjust minimum and maximum saddle height; then return saddle to mid-level.
- Check handlebar adjustment (height and angle).
- Check that the clamping levers (handlebar height and angle) are tight.

Expected result: Adjustments work and levers are tight Pass/Fail

5. Speed and Noise

- Check speed indication on LCD and additional speed indication for test subject.
- Check noise level of idling drive unit (e.g., for grinding noises or noise from the bearing).

Expected result: Speed displayed on both displays and no noticeable noise Pass/Fail

6. NIBP module (if applicable)

- Check blood pressure measurement on test subject at rest.
- Check blood pressure readings on LCD.

Expected result: BP values are displayed and in proper range Pass/Fail

7. Exercise test

- Start manual exercise test, e.g. initial load of 50 Watts / load change of 25 Watts.
- Check load level and load indication.

Expected result: Load changes as expected Pass/Fail

8. Communication (if applicable)

- If ergometer is remote-controlled from EKG unit or PC-ECG system, check connection cable.
- Check load control vial EKG unit or PC ECG system.
- Check remote start if applicable.

Expected result: Ergometer can be controlled by external unit Pass/Fail

A-2.2 Final Checkout Procedure and Functional Test of eBike L

1. Visually inspect the device

- Inspect coat of lacquer, cables/power cord, bellows on steering column and saddle.
- Inspect footboard for stability.
- Inspect cuff, tubing and tubing connection.
- Inspect couch adjustment motor for damage.
- Check the setup for stability, lock castor brakes, if required.

Expected result: No damage, instability or wear detected Pass/Fail

2. Check rests, cranks, pedals and Velcro strips

- Check that all clamping levers and star grips are firmly seated.
- Check that cranks, pedals, Velcro strips and pedal shoes are properly fixed.
- Inspect leg rests and their attachment, if leg rests are installed.
- Inspect head and arm rests as well as handgrips.
- Grease the threads of the clamping levers (every 6 months, depending on application purpose).

Expected result: All threads properly greased, cranks, rests and pedals OK Pass/Fail

3. Power on

- Using the power cord, connect the device to the power line and turn it on with the power switch.
- Wait for self-test to end: Check LCD, e.g. for error messages.
- Check in the software if the firmware version is OK.

Expected result: Device powers on without errors and FW is OK Pass/Fail

4. Couch adjustment motor

- Set motor to both stop positions.
- Change couch position from horizontal (0°) to semi-recumbent (45°) and then back to the horizontal position (0°).

Expected result: Couch position changes to the expected positions Pass/Fail

5. Saddle adjustment motor

- Check all possible positions by moving the saddle to the top and to the bottom position.
- Return saddle to the middle position.

Expected result: Saddle position changes to the expected positions Pass/Fail

6. Speed and Noise

- Check speed indication on LCD and additional speed indication for test subject.
- Check noise level of idling drive unit (e.g., for grinding noises or noise from the bearing).

Expected result: Speed displayed on both displays and no noticeable noise Pass/Fail

7. NIBP module (if applicable)

- Check blood pressure measurement on test subject at rest.
- Check blood pressure readings on LCD.

Expected result: BP values are displayed and in proper range Pass/Fail

8. Exercise test

- Start manual exercise test, e.g. initial load of 50 Watts / load change of 25 Watts.
- Check load level and load indication.

Expected result: Load changes as expected Pass/Fail

9. Communication (if applicable)

- If ergometer is remote-controlled from EKG unit or PC-ECG system, check connection cable.
- Check load control vial EKG unit or PC ECG system.
- Check remote start if applicable.

Expected result: Ergometer can be controlled by external unit Pass/Fail

A-2.3 Final Checkout Procedure and Functional Test of eBike EL

1. Visually inspect the device

- Inspect coat of lacquer, cables/power cord, bellows on steering column and saddle.
- Inspect footboard for stability.
- Inspect cuff, tubing and tubing connection.
- Inspect couch adjustment motor for damage.
- Check the setup for stability, lock castor brakes, if required.
- Inspect outrigger.

Expected result: No damage, instability or wear detected Pass/Fail

2. Check rests, cranks, pedals and Velcro strips

- Check that all clamping levers and star grips are firmly seated.
- Check that cranks, pedals, Velcro strips and pedal shoes are properly fixed.
- Fold down drop section.
- Inspect leg rests and their attachment, if leg rests are installed.
- Adjust and inspect hip support.
- Inspect head and arm rests as well as handgrips.
- Grease the threads of the clamping levers (every 6 months, depending on application purpose).

Expected result: All threads properly greased, cranks, rests and pedals OK Pass/Fail

3. Power on

- Using the power cord, connect the device to the power line and turn it on with the power switch.
- Wait for self-test to end: Check LCD, e.g. for error messages.
- Check in the software if the firmware version is OK.

Expected result: Device powers on without errors and FW is OK Pass/Fail

4. Both couch adjustment motors

- Set both motors to both stop positions.
- Change couch position from horizontal (0°) to semi-recumbent (45°) and then back to the horizontal position (0°).
- Check adjustment range for lateral tilt from the horizontal position (0°).

Expected result: Couch position changes to the expected positions Pass/Fail

5. Saddle adjustment motor

- Check all possible positions by moving the saddle to the top and to the bottom position.
- Return saddle to the middle position.

Expected result: Saddle position changes to the expected positions Pass/Fail

6. Speed and Noise

- Check speed indication on LCD and additional speed indication for test subject.
- Check noise level of idling drive unit (e.g., for grinding noises or noise from the bearing).

Expected result: Speed displayed on both displays and no noticeable noise Pass/Fail

7. NIBP module (if applicable)

- Check blood pressure measurement on test subject at rest.
- Check blood pressure readings on LCD.

Expected result: BP values are displayed and in proper range Pass/Fail

8. Exercise test

- Start manual exercise test, e.g. initial load of 50 Watts / load change of 25 Watts.
- Check load level and load indication.

Expected result: Load changes as expected Pass/Fail

9. Communication (if applicable)

- If ergometer is remote-controlled from EKG unit or PC-ECG system, check connection cable.
- Check load control vial EKG unit or PC ECG system.
- Check remote start if applicable.

Expected result: Ergometer can be controlled by external unit Pass/Fail

Only valid for Germany!

GE Medical Systems Information Technologies	**Prüfprotokoll gemäß MPBetreibV §6 Sicherheitstechnische Kontrolle §11 Messtechnischen Kontrolle Ergometer eBike, eBike L, eBike EL**	**Blatt 1 von 1 Prüfprotokollnr.: _____**

Die durchgeführten und nachfolgend dokumentierten Prüfungen sind das Ergebnis einer messtechnischen Kontrolle gemäß MPBetreibV ergänzt durch gerätespezifische Zusatzanforderungen von GEMS IT.

Geprüftes Ergometer: Type: _____ Serien Nr.: _____

Letzte Überprüfung: Datum: _____ Software: _____

SEV: (VDE0751)

SL-Widerstand <0,3 Ohm
gemessen: _____ Ohm

Ersatzgeräteableitstrom <0,75mA
gemessen: _____ mA

☐ Messgerät Type: _____
Serien Nr.: _____

☐ Messgerät Type: _____
Serien Nr.: _____

☐ Messgerät Type: _____
Serien Nr.: _____

☐ Messgerät Type: _____
Serien Nr.: _____

Drehzahl [min^{-1}]		Leistung [W]			Befund
Soll	Ist [±1]	Soll	max. Abw.	Ist	
30					
40					
50					
100					
120					
Regelverhalten < 3 Watt oder ± 5%					
40		25	± 3 Watt		
40		50	±3 Watt		
40		100	±5Watt		
70		200	±10 Watt		
90		500	±25 Watt		
100		600	±30 Watt		

Prüfstand Type: SN: geprüft bis: Prüf ID.Nr.:
Separates Protokoll

7-Segment-Anzeige vollständig?		Ergometergehäuse unbeschädigt?	
LCD-Kontrast in Ordnung?		Spannungsführende Teile nicht berührbar?	
Lenkerstange Befestigung/unbeschädigt?		Messkopf unbeschädigt?	
Sattelstange Befestigung/unbeschädigt?		Tastatur unbeschädigt/Funktion ok?	
Mechanische Sattelverstellung ok?		Sattel- und Lenkerklemmung gefettet?	
Elektrische Sattelverstellung ok? (nur Comfort/L/EL)		Elektrische Liegenverstellung ok (nur L/EL)?	
Mechanische Gerätestütze ok (nur EL)?		Elektrische Seitenverstellung ok (nur EL)?	
Bedienungsanleitung vorhanden?		Medizinproduktebuch vorhanden?	

bestanden ☐ nicht bestanden ☐ Bemerkungen:

Jahr der nächsten notwendigen messtechnischen Kontrolle: 20_ _

Datum: _____ Unterschrift : _____

GE Medical Systems *Information Technologies* GmbH, Munzinger Str. 3, D-79111 Freiburg, Germany

Only valid for Germany!

GE Medical Systems Information Technologies	**Prüfprotokoll über die Ergebnisse der messtechnischen Kontrolle gemäß §11, MPBetreibV**	**Blatt 1 von 1**
	Blutdruckmessgerät im Ergometer	**Prüfprotokollnr.:** _____

Die durchgeführten und nachfolgend dokumentierten Prüfungen sind das Ergebnis einer messtechnischen Kontrolle gemäß DIN EN 1060-1 und DIN EN 1060-3, ergänzt durch gerätespezifische Zusatzanforderungen von GEMS IT.

Geprüftes Ergometer: **Typ:** _____ **Serien Nr.:** _____

Letzte Kalibrierung: **Datum:** _____

☐ Da bei der messtechnischen Kontrolle Ihres Medizinproduktes das Medizinproduktebuch nicht vorlag, werden Sie gebeten, die nachstehenden Angaben für Ihre Dokumentation zu verwenden.

Durchgeführte Prüfung	**Prüfergebnis/ermittelte Werte**	**Bemerkungen**
1. Sichtprüfung:	☐ i.O. ☐ n.i.O.	
2. Funktionsprüfung:	BDM-Werte: systolisch: _____ mmHg diastolisch: _____ mmHg Pulsrate: _____ min^{-1}	☐ Proband ☐ Patientensimulator
3. Luftundichtheits-prüfung [< **6 mmHg/min.**]	Druckabfall (50 mmHg): _____ mmHg/min. Druckabfall (300 mmHg): _____ mmHg/min.	
4. Anzeigefehler des Manschettendrucks (nach Aufpumpen ca. 3 Sek. abwarten)	[± 3 **mmHg**] mmHg: 0 / 50 / 100 / 150 / 200 / 250 / 300	

	eingesetzte Prüf-/Messmittel	**Bezeichnung, Typ**	**Seriennummer**
	- Kalibriertes Druckmessgerät		
	- Patientensimulator für Blutdruck		
	- Sonstige		
	- Sonstige		
	- Sonstige		

bestanden ☐ nicht bestanden ☐ Bemerkungen:

Jahr der nächsten turnusmäßigen messtechnischen Kontrolle: 20_ _

Datum: _____	Unterschrift : _____
GE Medical Systems *Information Technologies* GmbH, Munzinger Str. 3, D-79111 Freiburg, Germany	

Part B. Mechanical Design

B.1 Operating Controls and Connections of eBike

B.1.a Operating Controls

eBike basic
with control terminal PC

eBike comfort
with control terminal PCplus

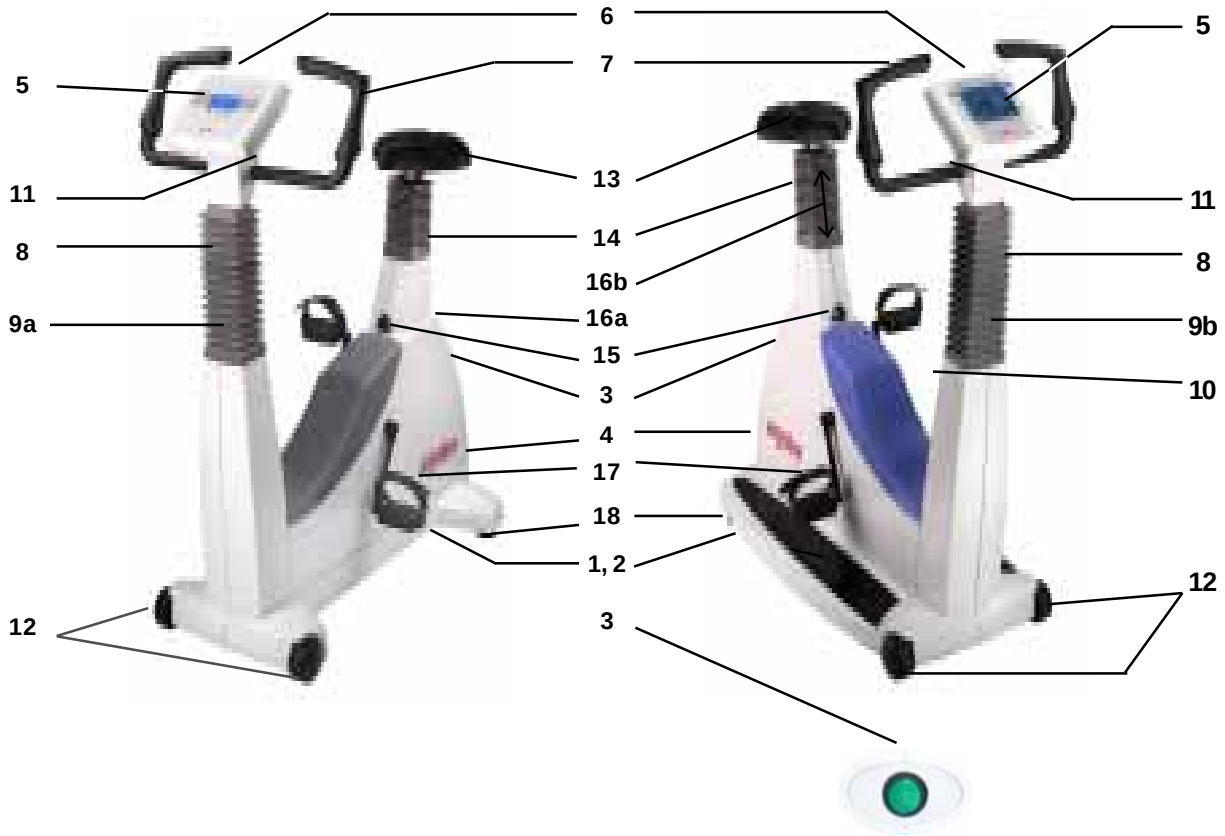


Figure B-1: Operating controls of bicycle ergometers eBike basic / comfort

1 Power input with mains fuse (section 2.3.1)
2 Interfaces (on bottom of ergometer)
3 Power switch
4 Nameplate with serial number
5 Control terminal with LCD and operating controls
6 Speed indication for patient
7 Handlebar
8 Bellows on steering column
9a **eBike basic**: Steering column (fixed height)
9b **eBike comfort:** Steering column, height adjustable
10 **eBike comfort:** Clamping lever for height adjustment of the handlebar
11 Clamping lever for angle adjustment of the handlebar
12 Castors
13 Saddle
14 Steering tube with bellows for saddle
15 LED indicating saddle height
16a **eBike basic**: Clamping lever for saddle adjustment
16b **eBike comfort**: Motor-driven saddle adjustment
17 Pedal
18 Levelling device for optimum stability

B.1.b Operating Controls and Connections of eBike L

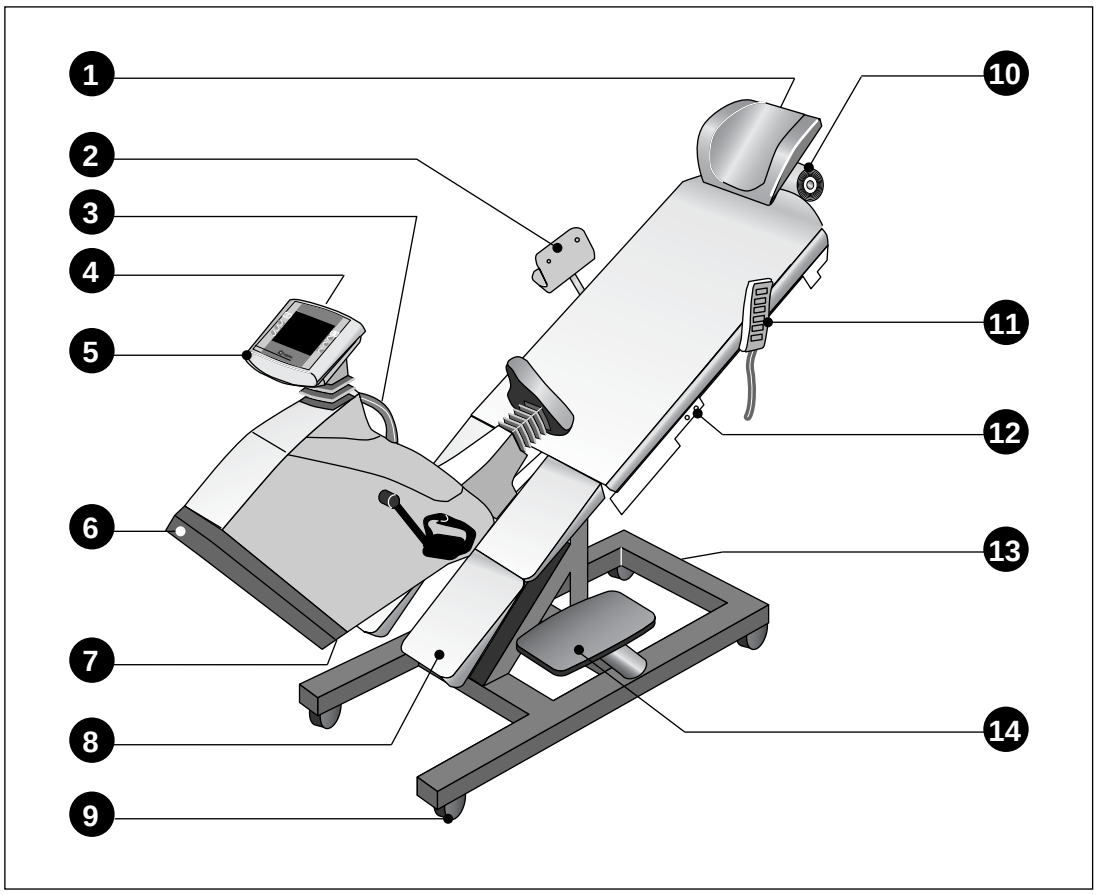


Figure B-2: Operating controls of bicycle ergometers eBike L

1 Clamping lever for adjustment of the head support
2 Arm rest for blood pressure measurements (right or left, on systems with blood pressure module only)
3 Handgrip (prop for mounting the bed and dismounting)
4 Speed readout for patient
5 Control terminal
6 Power switch
7 Connector panel (power input, fuses, etc.)
8 Leg rest (option)
9 Castors, locking
10 Paper roll
11 Remote control for adjustment of bed surface and saddle
12 Connector for blood pressure cuff, on both sides of the bed, type B applied part ( ) (on systems with blood pressure module only)
13 Nameplate
14 Footboard

B.1.c Operating Controls and Connections of eBike EL

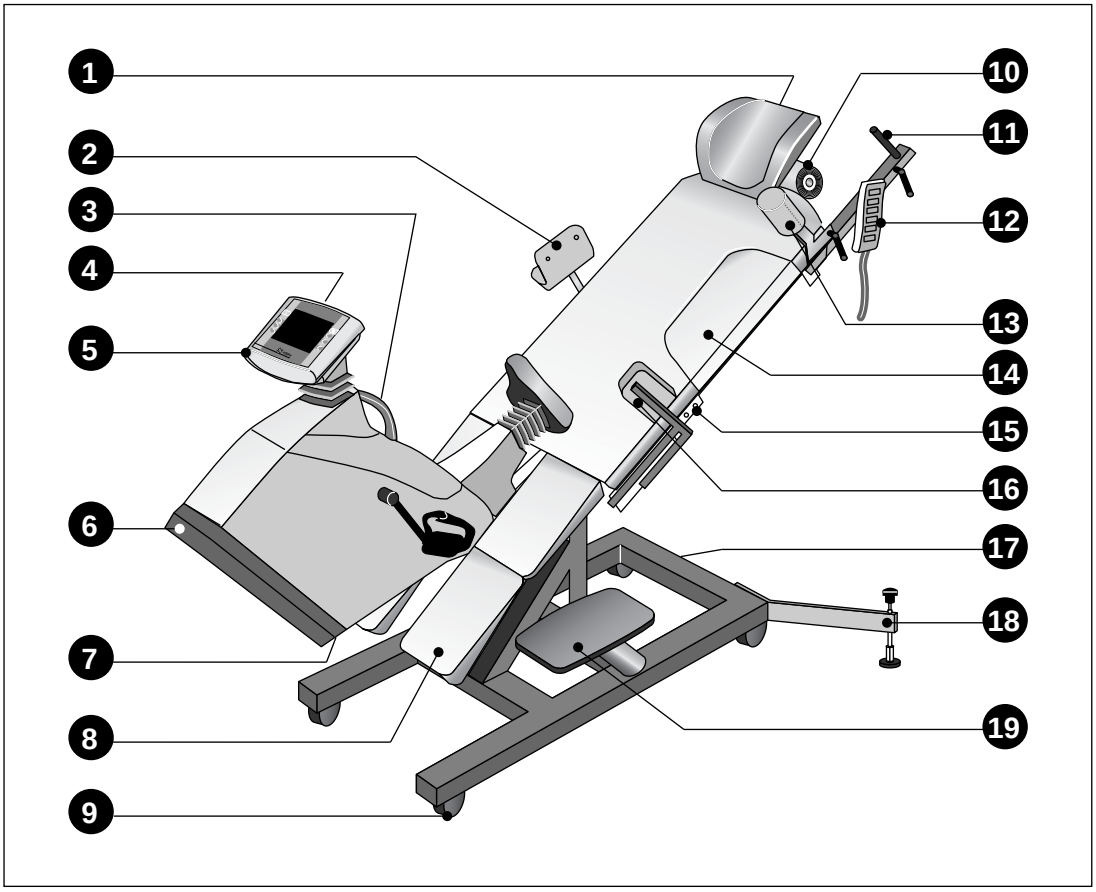
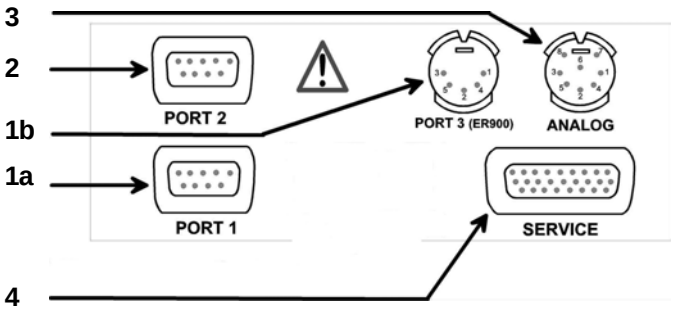
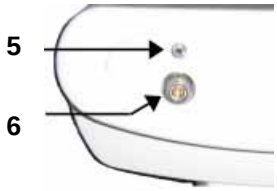


Figure B-3: Operating controls of bicycle ergometers eBike EL

1 Clamping lever for adjustment of the head support, release button for drop section **14**
2 Arm rest for blood pressure measurements (on stress-echo beds with blood pressure module only)
3 Handgrip (prop for mounting the bed and dismounting)
4 Speed readout for patient
5 Control terminal
6 Power switch
7 Connector panel (power input, fuses, etc.)
8 Leg rest (option)
9 Castors, locking
10 Paper roll
11 Upper handgrip, adjustable
12 Remote control for adjustment of bed surface and saddle
13 Armpit support, adjustable
14 Drop section
15 Connector for blood pressure cuff, on both sides of the bed, type B applied part ( ) (on stress-echo beds with blood pressure module only)
16 Hip support, adjustable
17 Nameplate
18 Outrigger
19 Footboard

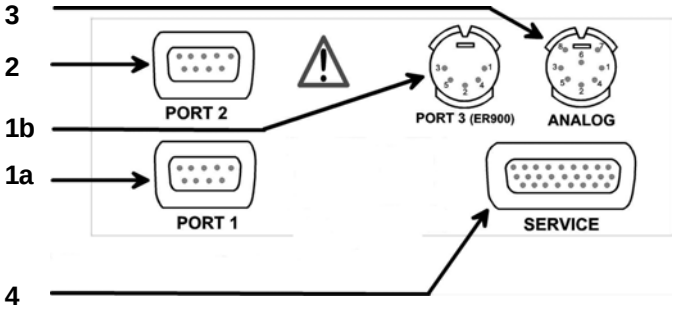
B.1.d Connections and Data Ports of the eBike

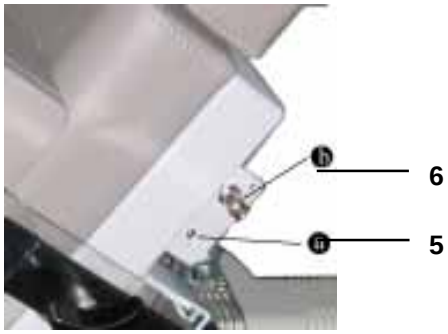




Underside of ergometer baseplate **Underside of control terminal**

Figure B-2: Connections and Data Ports of the eBike





eBike L / EL connection panel **eBike L / EL cuff connection**

Figure B-3: Connections and data ports of systems eBike L and eBike EL

1a **PORT 1**: Digital RS232 interface (9-pin Sub-D) for data communication with PC and EKG unit and output for remote start of the EKG unit.

1b **PORT 3**: Digital RS232 interface (5-pin DIN connector) for data communication with PC and EKG unit.

2 **PORT 2**: Additional digital RS232 interface, e.g., for software updates

3 **ANALOG**: Analog I/O port (8-pin DIN connector) for analog control and analog data communication.

4 **SERVICE** not used.

optional: NIBP module

5 Connector for jack plug of the microphone cable.

6 Connector for cuff tubing.

Note: For pin configurations, refer to Appendix A: Interfaces.

B.2 Overview: Mechanical Design eBike

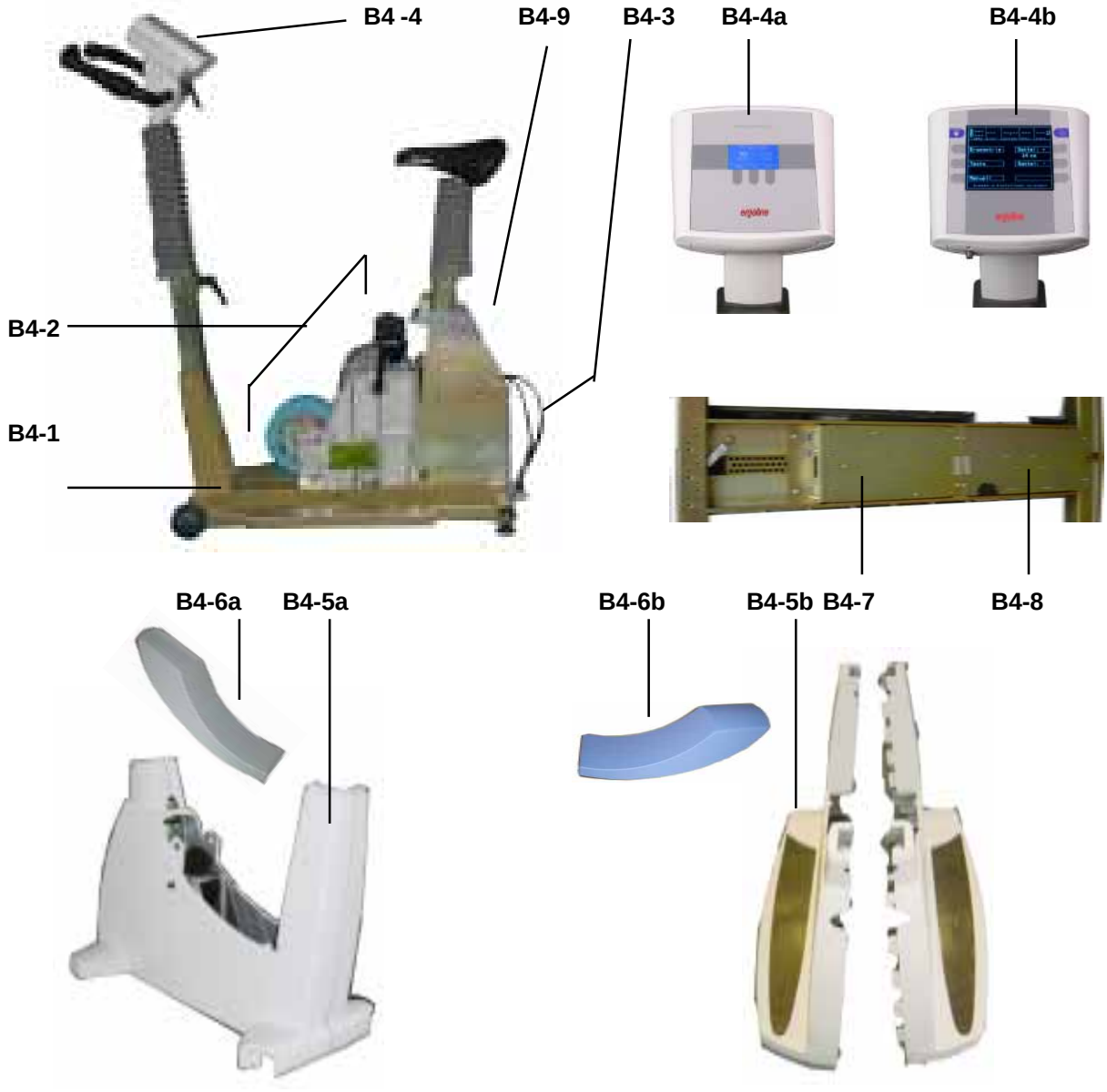


Figure B-4: Mechanical design of bicycle ergometers eBike basic

Item No.	Part No.	Description
B4-1		Ergometer base
B4-2		Load unit, fully assembled for eBike
B4-3		Power supply with power switch
B4-4		Control terminal PC (B2-4a) and control terminal PCplus (B2-4b)
B4-5		Casing eBike basic (B2-5a) and casing eBike comfort (B2-5b)
B4-6		Cover, grey (B2-6a) and cover, blue (B2-6b)
B4-7		PCB Interface in base assembly
B4-8		Pump unit for BP module in base assembly (optional)
B4-9		Saddle motor (eBike comfort only)

B-2.1 Overview: Disassembling the eBike basic/comfort

We recommend using the following tools to disassemble the device:

Flat bladed screwdrivers:

1 pc.	1.0 x 0.18 1 pc.
1 pc.	4.0 x 0.8
1 pc.	6.0 x 1.2

Philips screwdrivers:

PH 1	
1 pc.	PH 2
1 pc.	PH 3

Fork wrenches:

1 pc.	5.5 mm
2 pc.	7 mm
1 pc.	13 mm
1 pc.	17 mm
1 pc.	19 mm

Allan keys:

1 pc.	2.5 mm	straight
1 pc.	3 mm	straight and elbow
1 pc.	4 mm	straight and elbow
1 pc.	5 mm	straight
1 pc.	6 mm	straight and elbow

Socket wrenches :

1 pc.	5.5 mm
1 pc.	13 mm

Pliers

1 pc.	side cutter
1 pc.	flat nose pliers
1 pc.	multigrip pliers

Special tools

1 pc.	crank extractor
2 pc.	round pin, max. 3 mm, minimum length 15 mm

NOTE: Use the same tools to disassemble eBike L and eBike EL. Two wide metal angles may be required to remove the ergometer casing (side length approx. 1.5 cm x 15 cm).

PCB Interface (item a.) and the **pneumatic unit** of the BP module (item b.) can be removed without disassembling the device.

a. Remove PCB Interface

1. Disconnect device from mains!
2. Swivel handlebar to the front and tilt the ergometer 90°.
   The ergometer rests on the handlebar and the base assembly is accessible.
3. Disconnect all cables from PCB Interface (power cord and data cables).
4 Unscrew the 4 Philips screws and pull out PCB Interface.
5. If necessary, disconnect the cables from PCB Interface.
   On the PCB you will find designations for the different connectors, e.g. **Messkopf X150.**

b. Remove Pneumatic Unit of the Blood Pressure Module

1. Disconnect device from mains!
2. Remove PCB Interface, see item a.
3. Disconnect **NIBP X201** cable from PCB Interface.
4. Unscrew the 4 Philips screws and remove the pneumatic unit.
5. Disconnect NIBP tubing.

c. Remove Top Cover

Two plastic tabs hold the top cover in place in the housing. By inserting a tool such as a round pin with a max. diameter of 3 mm in a hole on the left and on the right you can press these tabs towards the inside.

- Using the round pins (max. diameter of 3 mm), simultaneously press in the the plastic tabs on the left and right and
- lift off the cover

d. Remove Casing

The shells of the casing must only be removed for repairs on the drive unit and on the power supply.

1. Disconnect device from mains!
2. Remove top cover (see item c.)
3. Take off right and left pedals.

- Remove protective cover from pedals.
- Using the extractor (P/N 2005737-001), unscrew the screw in the axle and remove (17-mm fork wrench required)
- Screw the extractor at least half way into the pedal axle (see Figure) Turn the half of the extractor that points away from the axle to the right until the pedal can be removed.

4. Take off front wheels
   - Using a thin screwdriver, carefully unseat the caps covering the wheels.
   - Remove snap ring from wheel retention.
   - Take off both wheels.
   - Unscrew screw of the threaded bolt on one side at the front and remove threaded bolt.

5. Pull bellows for steering column and saddle over retaining groove
   - Using an Allan key, remove threaded screw of the steering column and saddle housing (3-mm Allan key required).

6. Using a long 3-mm Allan key, remove both screws on the right and left of the drive unit casing.

7. Remove front and rear connection piece.
   - Loosen each hexagon socket screw on one side.
   - Remove front and rear connection piece.

8. Remove casing.

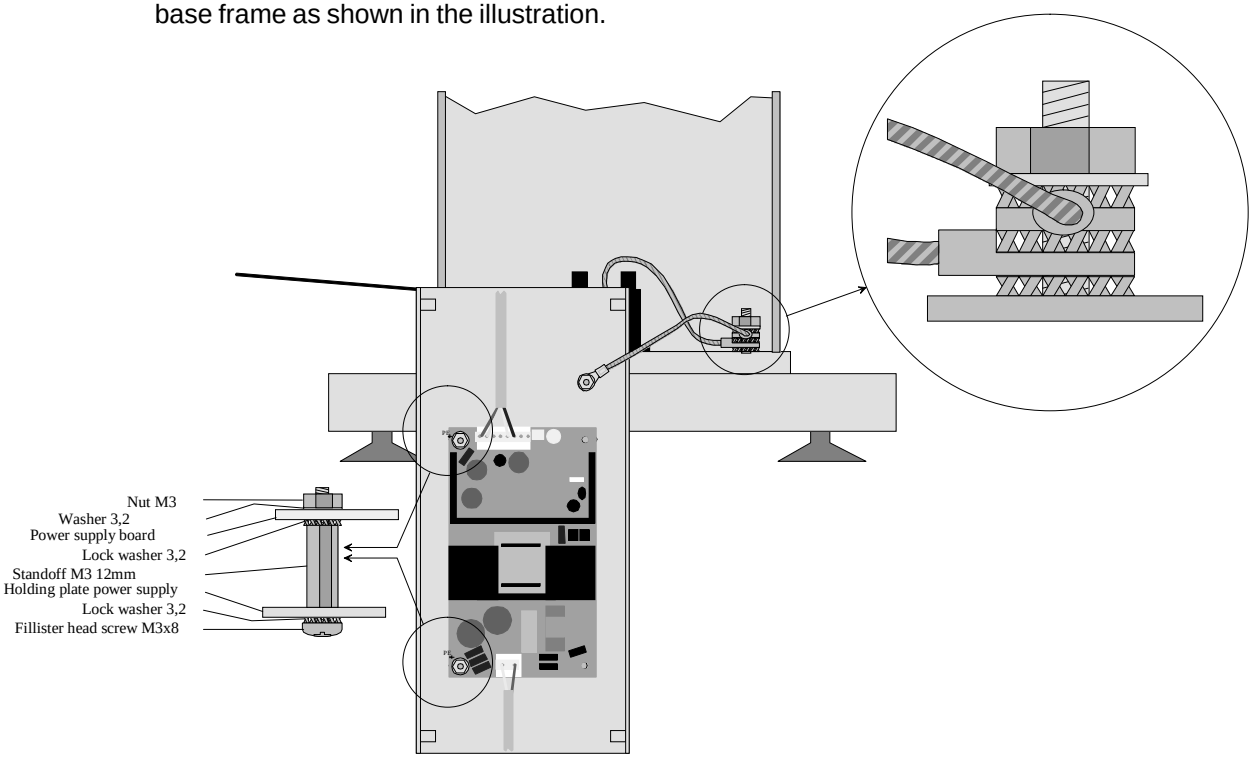
- Using a screwdriver with a wide blade, carefully spread he casing at the front, then at the rear.
- Carefully separate the two shells.

9. Reverse the above steps to reassemble.

e. Install Power Supply Module for eBike basic & comfort (P/N 2018111-141)

Replacement of large power supply ERS80US24M or small power supply EMC60US24.

- Install the ground wire of the power supply to the base frame as shown in the illustration.



f. Remove Saddle Motor (eBike comfort only)

Note: Position the saddle at mid-level before removing the saddle motor.

Once the power supply has been removed, you can proceed to removing the saddle motor.

- Disconnect connection cable of the saddle motor from PCB Interface **Sitz-Motor X152** and the connection cable of the saddle height sensor **Sitz-Sens X155**.
- Remove the saddle and pull off the bellows.
- Remove saddle host - to do so, unscrew both screws at the top, push down the saddle tube to allow the cylindrical pin to be removed from the saddle shaft.
- Remove clamping plate from saddle tube.
- Pull saddle tube off the saddle motor.

- Unscrew the 4 screws of the saddle guide tube and remove the tube.
- Loosen bottom fixation of the saddle motor (screw and nut are accessible via a hole at the bottom).
- Remove the saddle motor.

g. Remove Saddle Tube (eBike basic)

Once the power supply has been removed, you can proceed to removing the saddle tube.

- Disconnect connection cable of the seat height sensor **Sitz-Sens X155**.
- Remove the saddle and pull off the bellows.
- Disconnect saddle height sensor from saddle tube.
- Loosen clamping lever of the saddle tube and pull out the saddle tube.
  When loosening the clamping lever, take care not to drop the clamping plate.
- Unscrew the 4 screws of the saddle guide tube and remove the tube.

h. Remove/Install Saddle Height Sensor (eBike basic)

Once the power supply has been removed, you can proceed to removing the saddle saddle height sensor.

- Disconnect connection cable of the saddle height sensor from PCB Interface **Sitz-Sens X155**.
- Disconnect saddle height sensor from saddle tube.
- Unscrew the 2 screws securing the saddle height sensor and remove the sensor.

i. Remove Steering Column (incl. laying cables)

Before the steering column and the cables (spiral hose + cable connecting control terminal to PCB Interface) can be removed, PCB Interface, the pneumatic system of the BP module and the power supply must be removed.

- Remove the control terminal.
- Disconnect the cable connecting the control terminal to PCB Interface **Messkopf X150**.
- Disconnect NIBP tubing.

- Open cable ties of connection cable and spiral hose (see illustrations).
- Pull connection cable and spiral hose towards the steering column.
- Loosen clamping lever (**eBike comfort**) securing the handlebar or
  loosen fixation of the steering column (**eBike basic**).
  Caution: ultra-tight screw lock.
  In each case take care not to drop the clamping plate.
- Lift off the steering column.

Note: When installing the steering column with the spiral hose and connection cable, cable and hose must be slack and secured with cable ties (see illustrations).

j. Remove Drive Unit

- Disconnect connection cable of PCB RPM **X200** from PCB Interface
- Unscrew the 6 screws (M8x20) of the drive unit and lower the drive unit.

k. Remove PCB RPM

- Disconnect the PCB RPM cable **J3**.
- Remove connection **J5** to strain gauge.
- Unscrew the two screws of PCB RPM.
- Disconnect the two cables (**red** + **blue**) to the eddy-current brake.

l. Remove Strain Gauge and Prestress Spring

Refer to section E-3.2.1 for removal of the strain gauge.

- Carefully loosen the strain gauge.
  The retaining ball of the micro rope must not touch the rubber layer of the strain gauge (**risk of destruction**).
- Disconnect cable from **J5** on PCB RPM.
- Remove both hexagon socket screws of the strain gauge.
- Loosen both hexagon socket screws of the prestress spring and remove spring.
- Remove sealing varnish and take off both micro ropes.

m. Disassemble Control Terminal

Caution: Opening the control terminal will destroy the safety seal.
Therefore, the inspection of the BP measuring system may have to be repeated once the control terminal has been opened.

- **Remove the control terminal from the ergometer.**
- Open control terminal (remove safety seal and loosen the 4 screws).
- Take off bottom shell of the control terminal, then remove the electronic part that is secured with 4 screws.
- **Pull out the control terminal panel.**

Device with BP Functionality:

- Lift off PCB BP by squeezing the plastic locking pins.
- Remove cable ties.
- Remove cable connecting PCB BP to PDB Display.
- Disconnect air tubing.

When reassembling the control terminal, ensure proper positioning of cables and tubing.

B-3. Overview: Mechanical Design eBike L

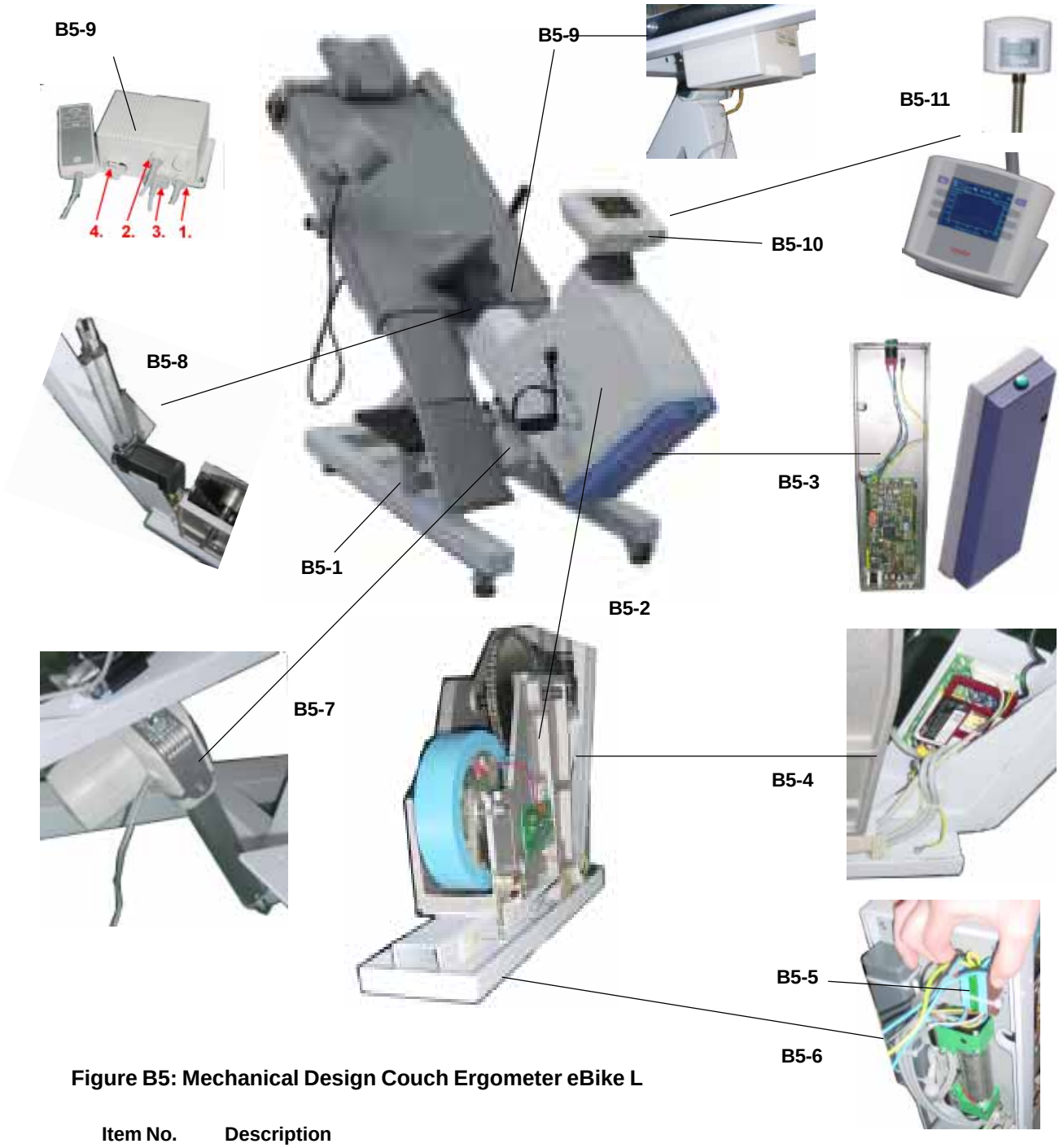


Figure B5: Mechanical Design Couch Ergometer eBike L

Item No.	Description
B5-1	Base of couch ergometer eBike L
B5-2	Load unit, installed
B5-3	Connection box with interface board and ON/OFF switch
B5-4	Power supply, installed for eBike L
B5-5	Modular cable connection
B5-6	Blood pressure pump module for eBike L (optional), mounted
B5-7	Lift motor for couch adjustment for eBike L
B5-8	Saddle motor for eBike L
B5-9	Motor control with hand switch, 2 channels for eBike L (1 - lift motor, 2 - saddle motor, 3 - remote control, 4 - mains connection)
B5-10	Control terminal for eBike L (eBike L basic only)
B5-11	External control terminal combined with additional speed indicator for patient (with eBike L external only)

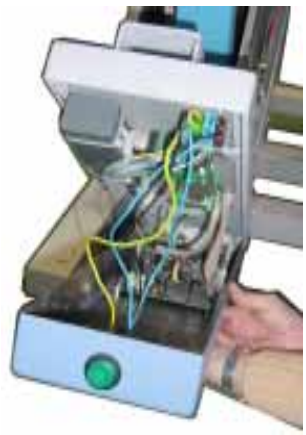
B-3.1 Overview: Disassembling eBike L

B-3.1.1 eBike L: Remove Connection Box

The connection box houses the interface board and the ON/OFF switch. In addition, the blood pressure pump module (option) is directly mounted on the frame (see Figure B5-5).

Follow these steps to remove the connection box:

1. Disconnect device from mains!
2. Unscrew 3 Phillips screws on the left and on the right (the illustration shows the device with the casing removed).
3. Support connection box from below, then take it off.
4. Disconnect the following cables:
   a1. Modular cable connection (**B5-5**) to ON/OFF switch
   a2. Miscellaneous cable connections on the interface board.
5. Take off the connection box from below.



B-3.1.2 eBike L: Remove Casing

Remove the casing, before repairing the drive unit and/or the power supply unit and before installing the blood pressure module. Follow these steps:

1. **Remove Saddle**
   a. Move the saddle to a higher position and push the bellows at the saddle support column down.
   b. Remove snap ring and take out the bolt (see illustration).
   c. Remove saddle

2. Disconnect system from mains!
3. Remove connection box (see section 3.1.1)

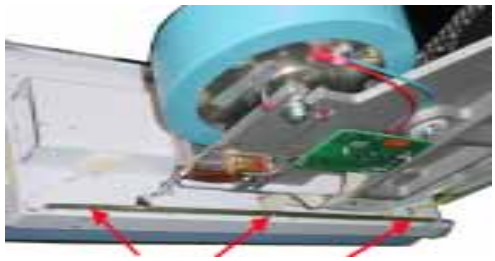
4. Take off right and left pedals/pedal shoes.

   a. Remove protective cover from pedals
   b. Using the extractor (P/N 2005737-001), unscrew the screw in the axle and remove (17-mm fork wrench required)
   c. Screw the extractor at least half way into the pedal axle.
      Turn the half of the extractor that points away from the axle to the right until the crank can be removed.

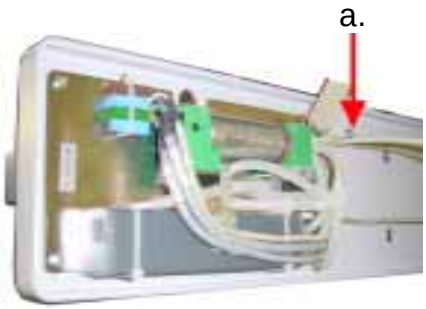
5. Remove Casing

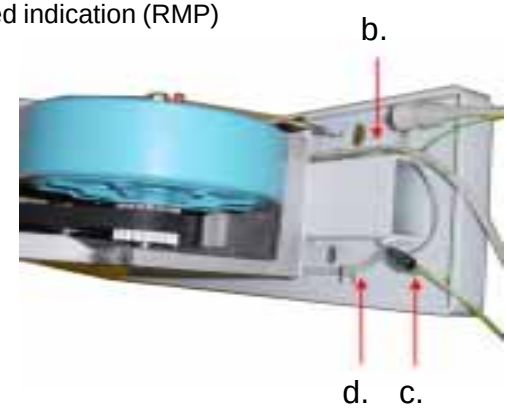
   a. Loosen all casing screws - 3 on each side, see arrow in illustration.
      Important: DO NOT REMOVE the casing screws - see red arrows - <u>from the clamping rail</u>.

      Use two large screw drivers or two metal angles (side length approx. 1.5 cm x 15 cm) to pull the casing towards the outside at the pedal cutouts. Then pull the casing first upward over the saddle motor in the direction of the couch surface and then approx. 10 to 15 cm upward so that the required cable and tubing connections can be disconnected.



   b. Disconnect the following cables:
      - Ground clamp at the bottom of the swivel section (see red arrow **a** in illustration at left)
      - Ground cable (see **b** and **c** in illustration at right) (secured with adjustable cable tie)
      - eBike L basic with blood pressure only: blood pressure tubing **d** + microphone cable
      - eBike L external only: disconnect cable for speed indication (RMP)





   c. Carefully take off the casing.

6. Install Casing

Reverse the above steps to reinstall. Be careful to route the ground cable, blood pressure tubing + microphone cable (option) and/or the cable for the RPM indication (option) correctly.

B-3.1.3 eBike L: Replace Saddle Motor

Troubleshooting:

Before replacing the saddle motor make sure that the motor is actually defective.

For this check, switch the hexagon socket of the saddle motor from channel 2 to channel 1.

If the motor does not work, it is out of order and must be replaced. If the motor works, the motor control unit or the hand switch is defective.

Before you can replace the saddle motor, the connection box and the casing must be removed first.

Then follow these steps to replace the saddle motor:

1. Loosen both hexagon socket screws **a.** of the saddle guide.
2. Remove pin **b.** with self-locking screw.
3. Disconnect plug of cable **c.** at motor control (connector **2.** in illustration). To do so, first turn jack plug counterclockwise as far as possible (e.g. using a suitable fork wrench), then pull out the jack plug.
   Open cable tie and pull cable towards the saddle motor.

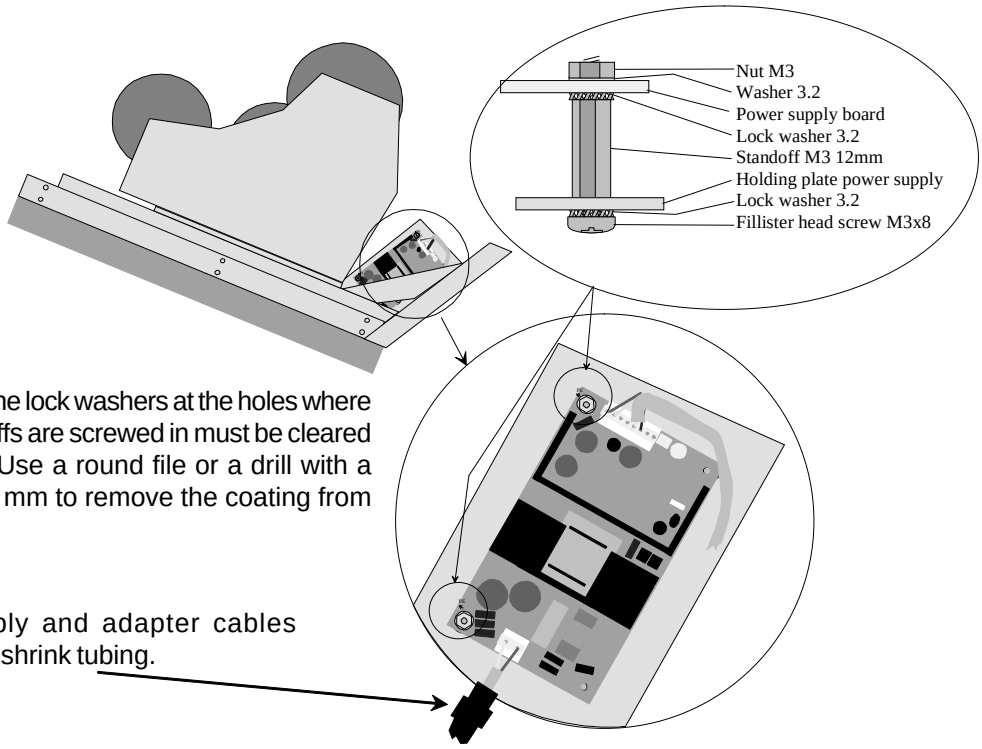
Note:
To facilitate pulling in the new saddle motor cable, attach a draw rope to the cable of the old saddle motor.

Note:
When mounting the new saddle motor, secure the motor control connection cable with a cable tie **d.**, as shown in the illustration.

B-3.1.4 eBike L: Install Power Supply Module for eBike L (P/N 2018111-142)

Replacement of large power supply ERS80US24M or small power supply EMC60US24.

When replacing the power supply, it is **mandatory** to replace the supplied connection cable as well.



The area below the lock washers at the holes where the metal standoffs are screwed in must be cleared of any coating. Use a round file or a drill with a diameter of 4.1 mm to remove the coating from the hole.

Wrap the supply and adapter cables together in heat-shrink tubing.

The connectors on power supply are not compatible with those of the previous power supplies.

The entire connection cable between power supply and IFP board (24VDC, secondary) is replaced.

An adapter cable must be attached to the connection cable between the modular connector and the power supply (230VAC, primary).

It is absolutely mandatory to secure the connection between the adapter and the cable inside the device with the shrink tubing supplied.

Supplied material

1 x adapter cable

1 x shrink tubing Ø18mm, length 50mm

1. Connect adapter to cable

   Important: the catch must lock into place

2. Slip the shrink tubing over the connection

3. Shrink down with a hot air gun.

Ensure that the connection is in the middle of the length of tubing.

4. Now connect the cable to the power supply.

B-3.1.5 eBike L: Replace Lift Motor for Couch Adjustment

Troubleshooting:

Before replacing the lift motor for couch adjustment make sure that the motor is actually defective.

For this check, switch the hexagon socket of the lift motor from channel 2 to channel 1.

If the motor does not work, it is out of order and must be replaced. If the motor works, the motor control unit or the hand switch is defective.

Follow these steps to replace the couch adjustment motor:

1. Set motor to the end position where the couch surface is completely horizontal.
2. Disconnect system from mains!
3. **When the lift motor has been removed, the couch surface must be protected against falling down!**
4. Disconnect connector **2.** (see illustration) at motor control. To do so, first turn jack plug counterclockwise as far as possible (e.g. using a suitable fork wrench), then pull out the jack plug.
   Loosen cable tie of the connection cable.
5. Remove pins **b.** + **c.** with self-locking screw.
6. Remove lift motor.

Note:
Reverse the above steps to install the new lift motor. Secure the connection cable to the motor control unit with cable ties.

B-3.1.6 eBike L: Replace Motor Control Unit

Troubleshooting:

Before replacing the motor control unit make sure that it is actually defective.

For this check, use a new hand switch (the hand switch for eBike EL can also be used) and test the motor functions.

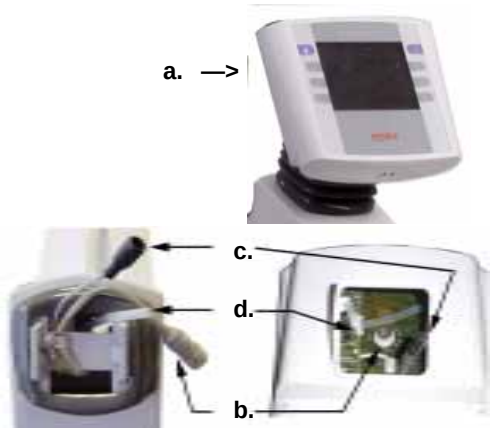
If the control unit does not work, it is out of order and must be replaced. If it works, the hand switch is defective.

Follow these steps to replace the motor control unit (couch and saddle adjustment):

1. Disconnect device from mains!
2. Loosen the four fixing screws.
3. Disconnect connectors **1.**, **2.**, **3.** and **4.** at the motorcontrol unit.
   To do so, first turn jack plugs **1.** and **2.** counterclockwise as far as possible (e.g. using a suitable fork wrench), then pull out the jack plug.
   Use a small flat screw driver to lift the tabs of connectors **3.** and **4.**, at the same time removing the connector with pliers.
4. Remove motor control unit.

B-3.1.7 eBike L Basic: Replace Control Panel

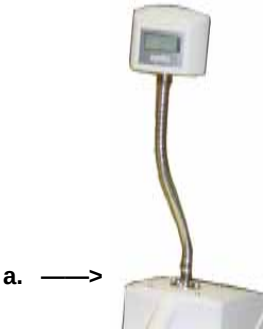
1. Remove both screws (**a.**) securing the control terminal.
2. Carefully lift the control terminal and push down the bellows.
3. Disconnect the following cables:
   b. - data cable to control terminal (turn coupling ring counterclockwise)
   c. - microphone cable (option)
   d. - air hose (option)



B-3.1.8 eBike L External: Replace External Speed Indicator

Note: Before you can remove the external speed indicator, you will have to lift the casing a little (see section **B-3.1.2**, **item 5b**) for details.

1. Open connection box as per section **B-3.1.1**, **item 4**. Disconnect connection cable for external speed indicator from interface board.
2. Slightly lift casing as per section **B-3.1.2**, **item 5b**. Open adjustable cable ties and disconnect connection cable for external speed indicator.
3. Unscrew the screw (**a.**) securing the external speed indicator and remove the speed indicator by pulling it upward.



B-4. Overview: Mechanical Design eBike EL

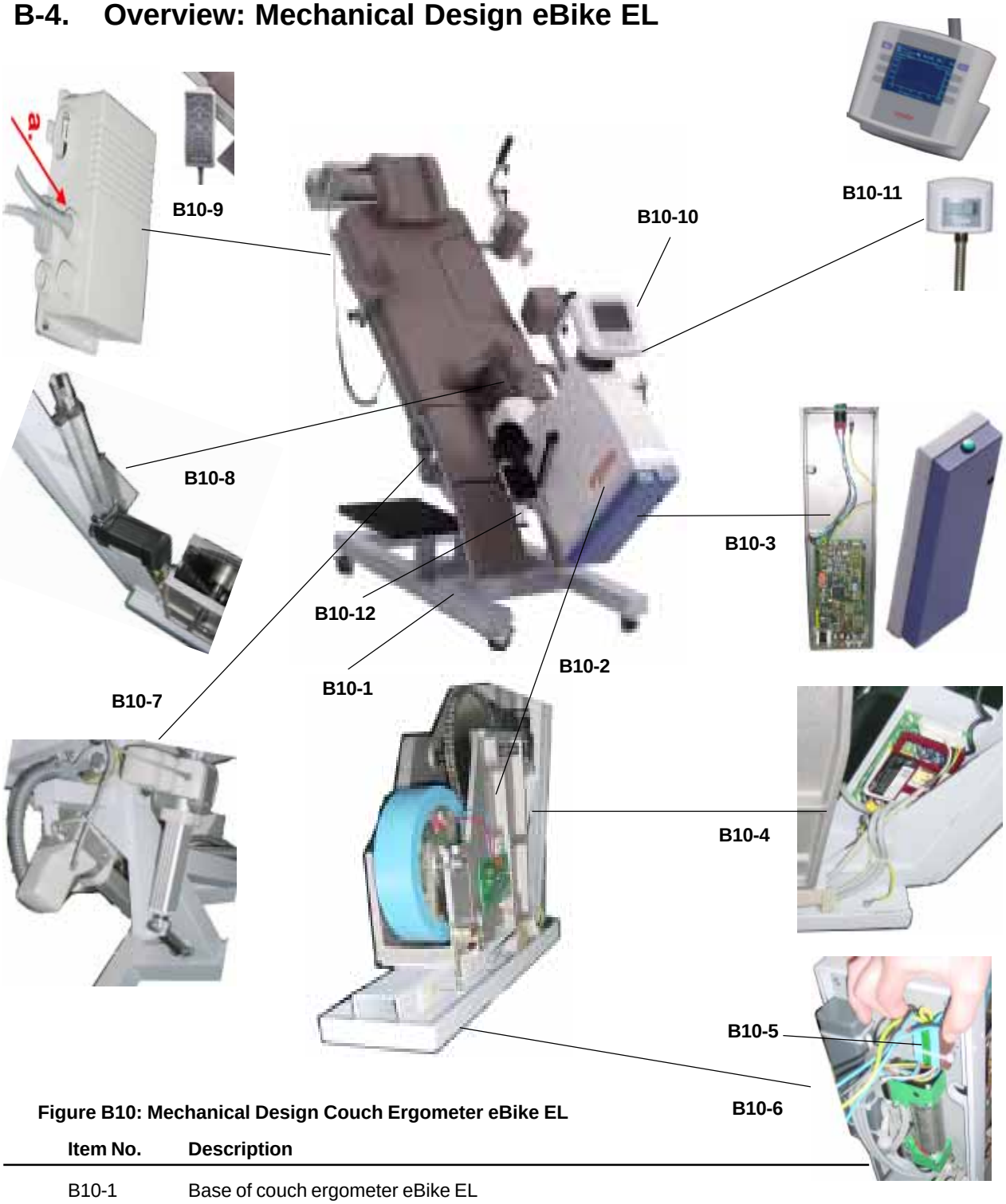


Figure B10: Mechanical Design Couch Ergometer eBike EL

Item No.	Description
B10-1	Base of couch ergometer eBike EL
B10-2	Load unit, installed
B10-3	Connection box with interface board and ON/OFF switch
B10-4	Power supply unit installed
B10-5	Modular cable connection
B10-6	Blood pressure pump module for eBike EL (optional)
B10-7	Lift motors for couch adjustment (longitudinal and lateral tilt) for eBike EL
B10-8	Saddle motor for eBike EL
B10-9	Motor control with hand switch, 3 channels for eBike EL (1 - lift motor, longitudinal, 2 - lift motor, left lateral tilt, 3 - saddle motor, 4 - remote control, 5 - mains connection)
B10-10	Control terminal for eBike EL (eBike EL basic only)
B10-11	External control terminal combined with additional speed indicator for patient (with eBike EL external only)
B10-12	Outrigger eBike EL

B-4.1 Overview: Disassembling eBike EL

B-4.1.1 eBike EL: Remove Connection Box

The connection box houses the interface board and the ON/OFF switch. In addition, the blood pressure pump module (option) is directly mounted on the frame (see Figure B5-5).

Follow these steps to remove the connection box:

1. Disconnect device from mains!
2. Unscrew 3 Phillips screws on the left and on the right (the illustration shows the device with the casing removed).
3. Support connection box from below, then take it off.
4. Disconnect the following cables, if required:
   a1. Modular cable connection (**B10—5**) to ON/OFF switch
   a2. Miscellaneous cable connections on the interface board.
5. Take off the connection box from below.

B-4.1.2 eBike EL: Remove Casing

Remove the casing, before repairing the drive unit and/or the power supply unit and before installing the blood pressure module. Follow these steps:

1. **Remove Saddle**
   a. Move the saddle to a higher position and push the bellows at the saddle support column down.
   b. Remove snap ring and take out the bolt (see illustration).
   c. Remove saddle

2. Disconnect system from mains!
3. Remove connection box (see section 3.1.1)

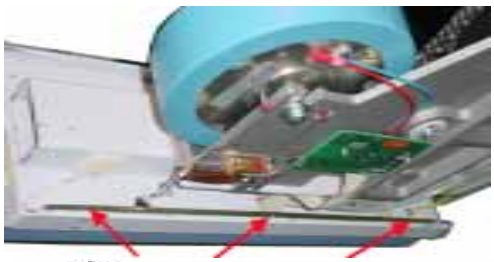
4. Take off right and left pedals/pedal shoes.

   a. Remove protective cover from pedals
   b. Using the extractor (P/N 2005737-001), unscrew the screw in the axle and remove (17-mm fork wrench required)
   c. Screw the extractor at least half way into the pedal axle.
      Turn the half of the extractor that points away from the axle to the right until the crank can be removed.

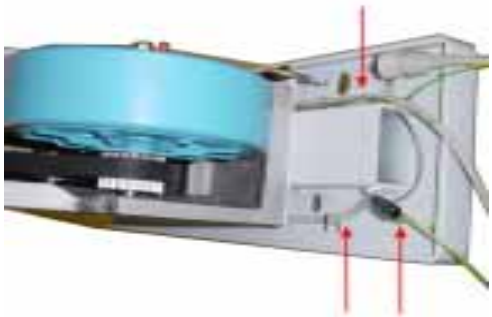
5. Remove Casing

   a. Loosen all casing screws - 3 on each side, see arrow in illustration.
      Important: DO NOT REMOVE the casing screws - see red arrows - <u>from the clamping rail</u>.

      Use two large screw drivers or two metal angles (side length approx. 1.5 cm x 15 cm) to pull the casing towards the outside at the pedal cutouts. Then pull the casing first towards the front over the saddle motor and then approx. 10 to 15 cm upward so that the required cable and tubing connections can be disconnected..



   b. Disconnect the following cables:
      - Ground clamp at the bottom of the swivel section (see red arrow 1 in illustration at left)
      - Ground cable (see red arrows in illustration at right) (secured with adjustable cable tie)
      - eBike EL basic with blood pressure only: blood pressure tubing + microphone cable
      - eBike EL external only: disconnect cable for speed indication (RMP)



   c. Carefully take off the casing.

6. Install Casing

Reverse the above steps to reinstall. Be careful to route the ground cable, blood pressure tubing + microphone cable (option) and/or the cable for the RPM indication (option) correctly. When reinstalling the casing, check that connection cable and air hose are not squeezed.

B-4.1.3 eBike EL: Replace Saddle Motor

Troubleshooting:

Before replacing the saddle motor make sure that it is actually defective.

For this check, switch the hexagon socket of the saddle motor from channel 3 to channel 1 or 2.

If the motor does not work, it is out of order and must be replaced. If the motor works, the motor control unit or the hand switch is defective.

Before you can replace the saddle motor, the connection box and the casing must be removed first.

Then follow these steps to replace the saddle motor:

1. Loosen both hexagon socket screws **a.** of the saddle guide.
2. Remove pin **b.** with self-locking screw.
3. Disconnect plug of cable **c.** at motor control (connector **3.** in illustration). To do so, first turn jack plug counterclockwise as far as possible (e.g. using a suitable fork wrench), then pull out the jack plug.
   Open cable tie and pull cable towards the saddle motor.

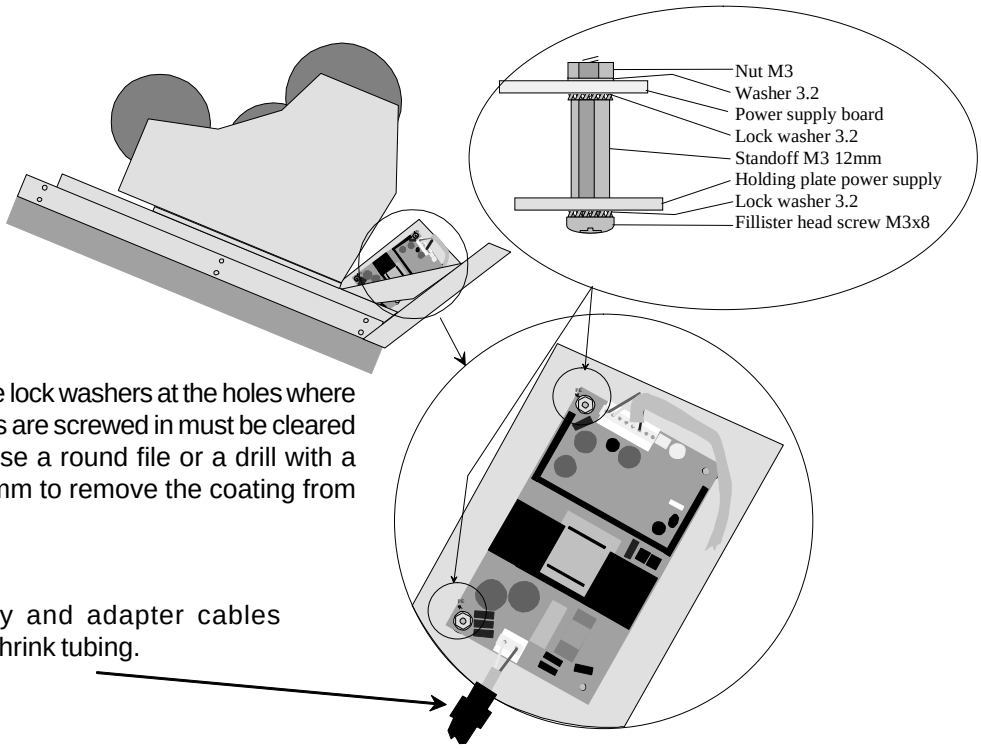
Note:
To facilitate pulling in the new saddle motor cable, attach a draw rope to the cable of the old saddle motor.

Note:
When mounting the new saddle motor, secure the motor control connection cable with a cable tie **d.**, as shown in the illustration.

B-4.1.4 eBike EL: Install Power Supply Module for eBike EL (P/N 2018111-142)

Replacement of large power supply ERS80US24M or small power supply EMC60US24.

When replacing the power supply, it is **mandatory** to replace the supplied connection cable as well.



The area below the lock washers at the holes where the metal standoffs are screwed in must be cleared of any coating. Use a round file or a drill with a diameter of 4.1 mm to remove the coating from the hole.

Wrap the supply and adapter cables together in heat-shrink tubing.

The connectors on power supply are not compatible with those of the previous power supplies.

The entire connection cable between power supply and IFP board (24VDC, secondary) is replaced.

An adapter cable must be attached to the connection cable between the modular connector and the power supply (230VAC, primary).

It is absolutely mandatory to secure the connection between the adapter and the cable inside the device with the shrink tubing supplied.

Supplied material

1 x adapter cable

1 x shrink tubing Ø18mm, length 50mm

1. Connect adapter to cable

   Important: the catch must lock into place

2. Slip the shrink tubing over the connection

3. Shrink down with a hot air gun.

Ensure that the connection is in the middle of the length of tubing.

4. Now connect the cable to the power supply.

B-4.1.5eBike EL: Replace Lift Motors for Couch Adjustment

Troubleshooting:

Before replacing lift motor 1 or 2 for couch adjustment make sure that the motor is actually defective.

For this check, switch the hexagon socket of lift motor 1 from channel 1 to channel 2 or 3. For a test of lift motor 2, switch the hexagon socket from channel 2 to channel 1 or 3.

If the motor does not work, it is out of order and must be replaced. If the motor works, the motor control unit or the hand switch is defective.

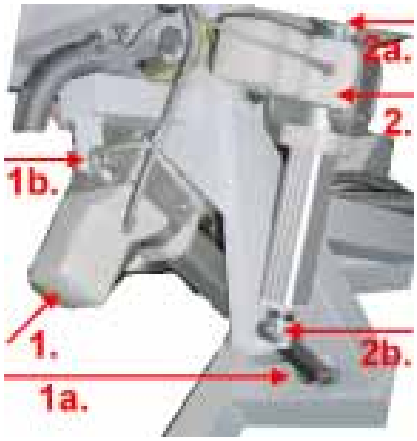
Follow these steps to replace the couch adjustment motor:

1. **Set motor to the end position where the couch surface is completely horizontal and has a lateral tilt of 0°.**
2. **When a motor has been removed, the couch surface must be protected against falling down!**
3. Disconnect system from mains!
4. Disconnect connector **1.** (lift motor for longitudinal adjustment) and/or connector **2.** (lift motor for left lateral tilt) from motor control unit. To do so, first turn jack plug counterclockwise as far as possible (e.g. using a suitable fork wrench), then pull out the jack plug.

Loosen cable tie of the respective connection cables.

5. Remove pins **1a.** + **1b.** (lift motor for longitudinal adjustment) and/or pins **2a.** + **2b.** (lift motor for left lateral tilt) with self-locking screw.
6. Remove lift motor.

Note:
Reverse the above steps to install the new lift motor. Secure the connection cable to the motor control unit with cable ties.



B-4.1.6 eBike EL: Replace Motor Control Unit

Troubleshooting:

Before replacing the motor control unit make sure that it is actually defective.

For this check, use a new hand switch for eBike EL and test the motor functions.

If the control unit does not work, it is out of order and must be replaced. If it works, the hand switch is defective.

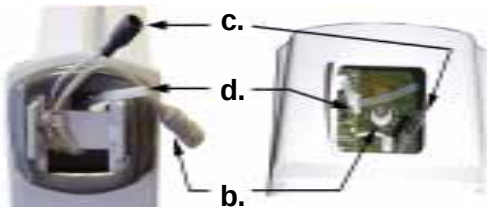
Follow these steps to replace the motor control unit (couch and saddle adjustment):

1. Disconnect device from mains!
2. Loosen the four fixing screws.
3. Disconnect connectors **1.** - **5.** from motor control unit.
   To do so, first turn jack plug counterclockwise as far as possible (e.g. using a suitable fork wrench), then pull out the jack plug.

   Use a small flat screw driver to lift the tabs of connectors **4.** and **5.**, at the same time removing the connector with pliers.
4. Remove motor control unit.

B-4.1.7 eBike EL Basic: Replace Control Panel

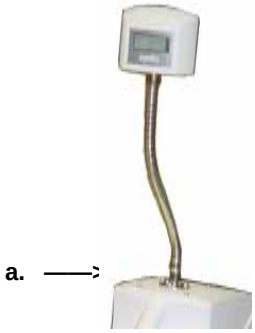
1. Remove both screws (**a.**) securing the control terminal.
2. Carefully lift the control terminal and push down the bellows.
3. Disconnect the following cables:
   - **b** - data cable to control terminal (turn coupling ring counterclockwise)
   - **c** - microphone cable (option)
   - **d** - air hose (option)



B-4.1.8 eBike EL External: Replace External Speed Indicator

Note: Before you can remove the external speed indicator, you will have to lift the casing a little (see section **B-4.1.2**, **item 5b**) for details.

1. Open connection box as per section **B-4.1.1**, **item 4**. Disconnect connection cable for external speed indicator from interface board.
2. Slightly lift casing as per section **B-4.1.2**, **item 5b**. Open adjustable cable ties and disconnect connection cable for external speed indicator.
3. Unscrew the screw securing the external speed indicator and remove the speed indicator by pulling it upward.



For your notes

Part C: Electrical Design

C-1.1 Block Diagram eBike Basic / eBike Comfort for RPM Board 1

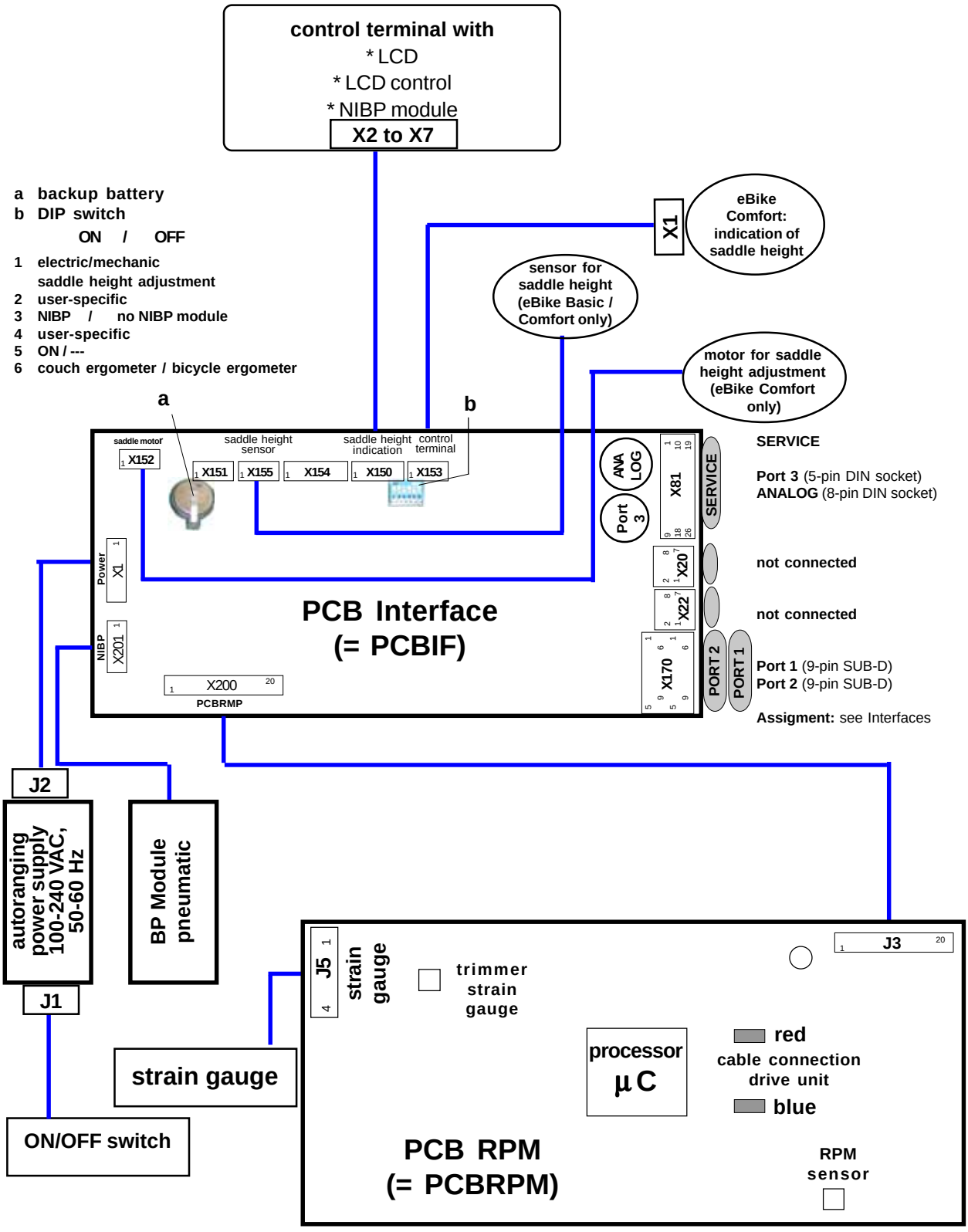


Figure C-1: Block Diagram eBike Basic / eBike Comfort for RPM Board 1

C-1.2 Block Diagram eBike Basic / eBike Comfort for RPM Board 2

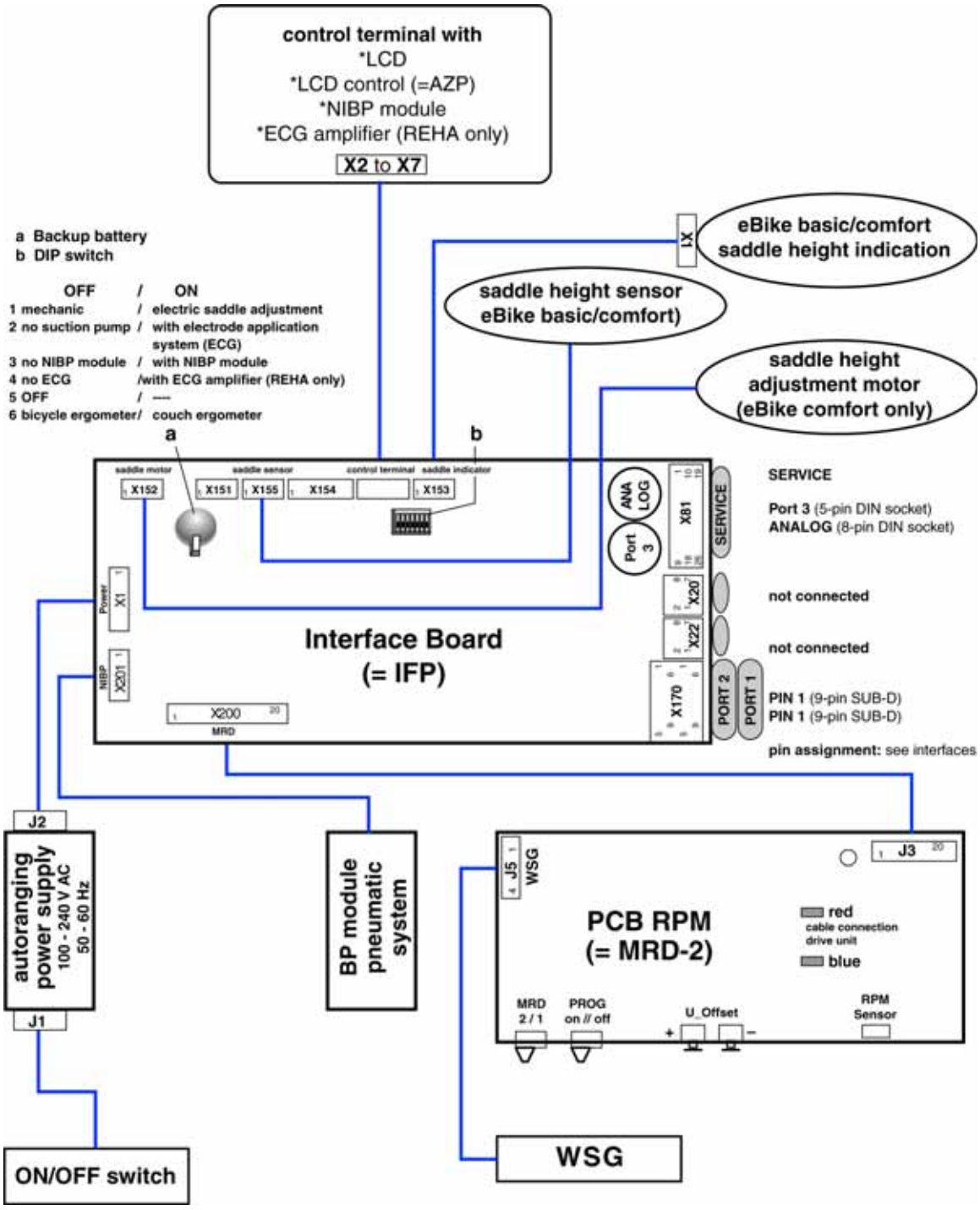


Figure C-2: Block Diagram eBike Basic / eBike Comfort for RPM Board 2

C-1.3 Block Diagram eBike L for RPM Board 1

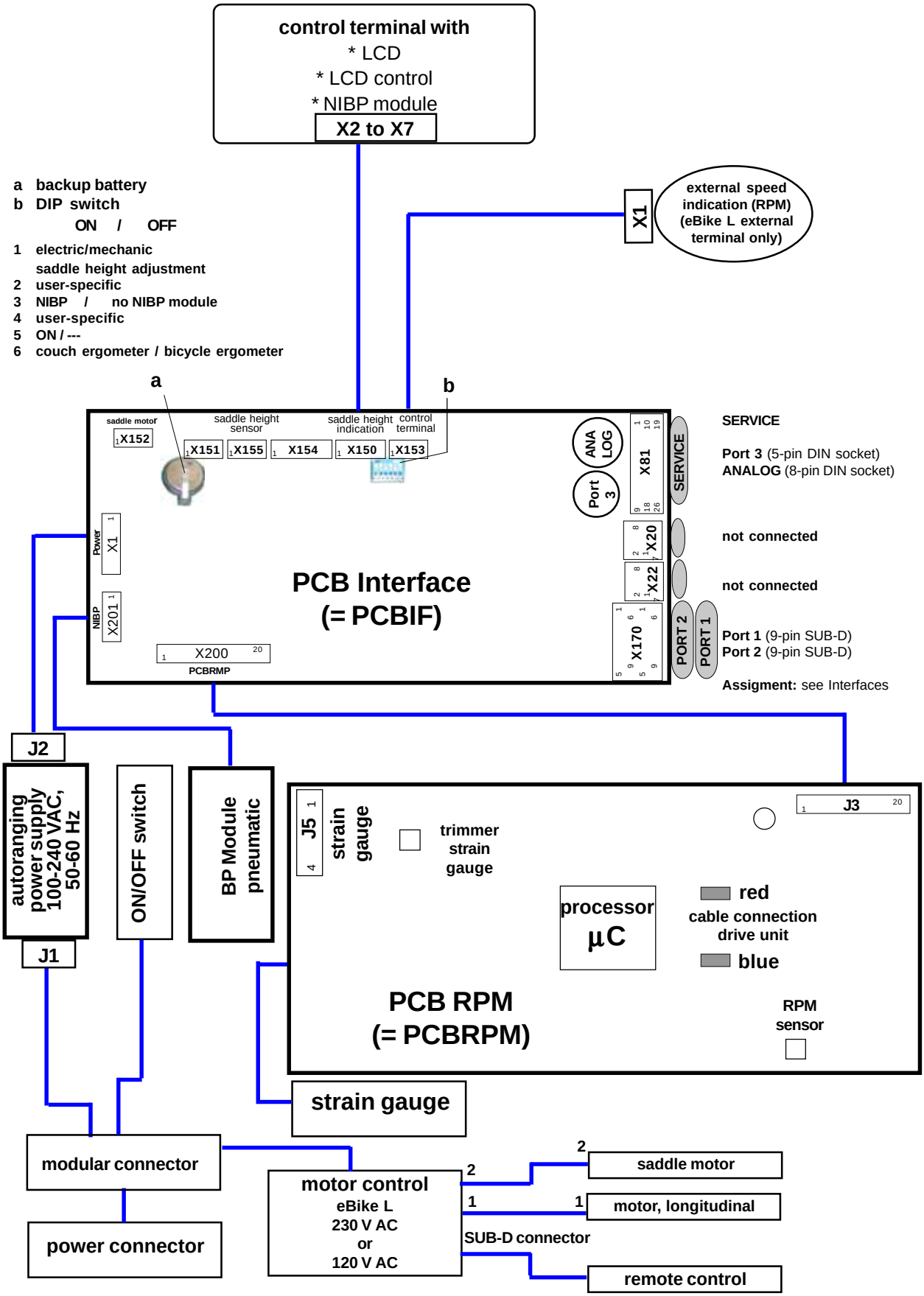


Figure C-3: Block Diagram eBike L for RPM Board 1

C-1.4 Block Diagram eBike L for RPM Board 2

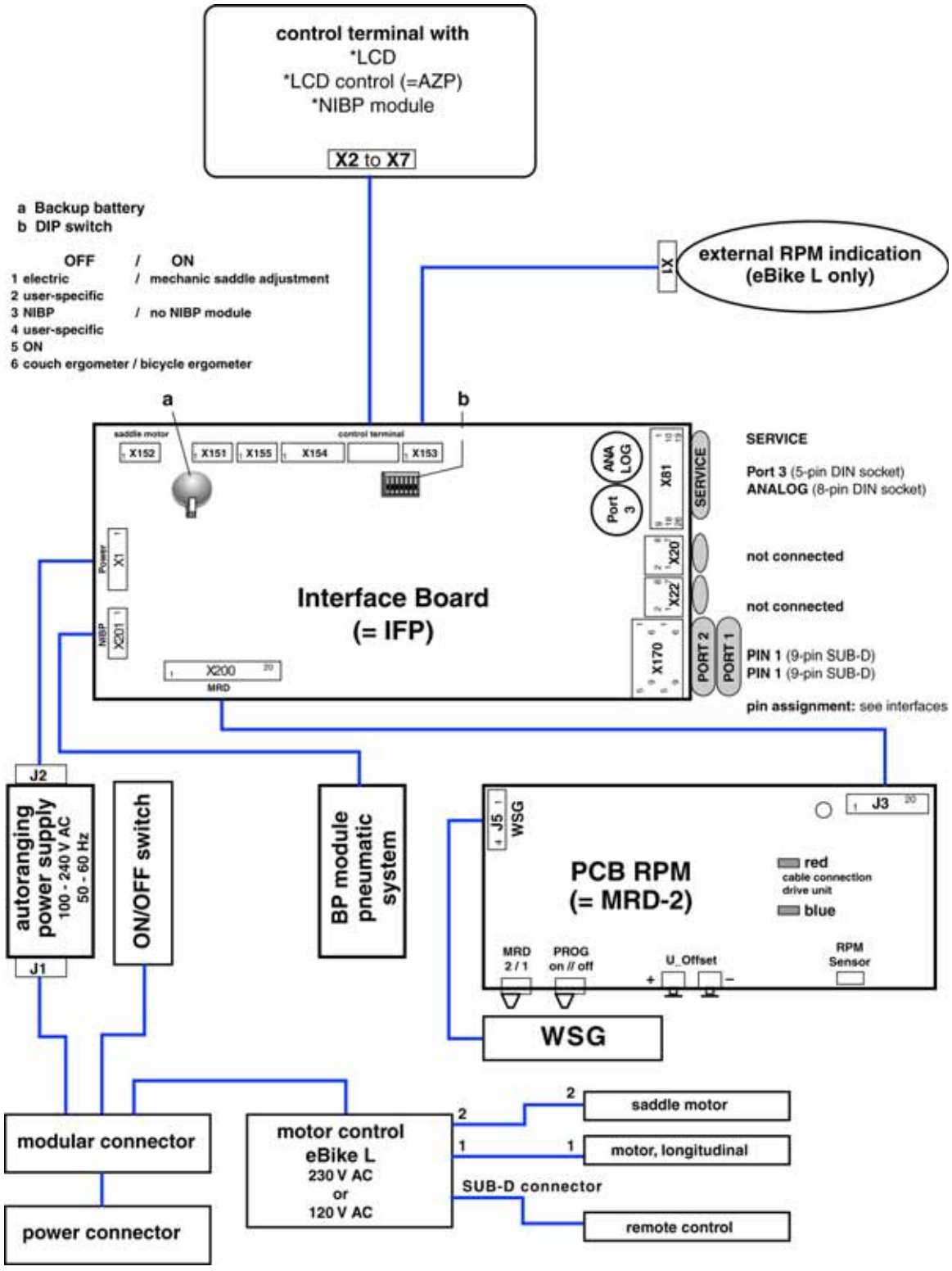


Figure C-4: Block Diagram eBike L for RPM Board 2

C-1.5 Block Diagram eBike EL for RPM Board 1

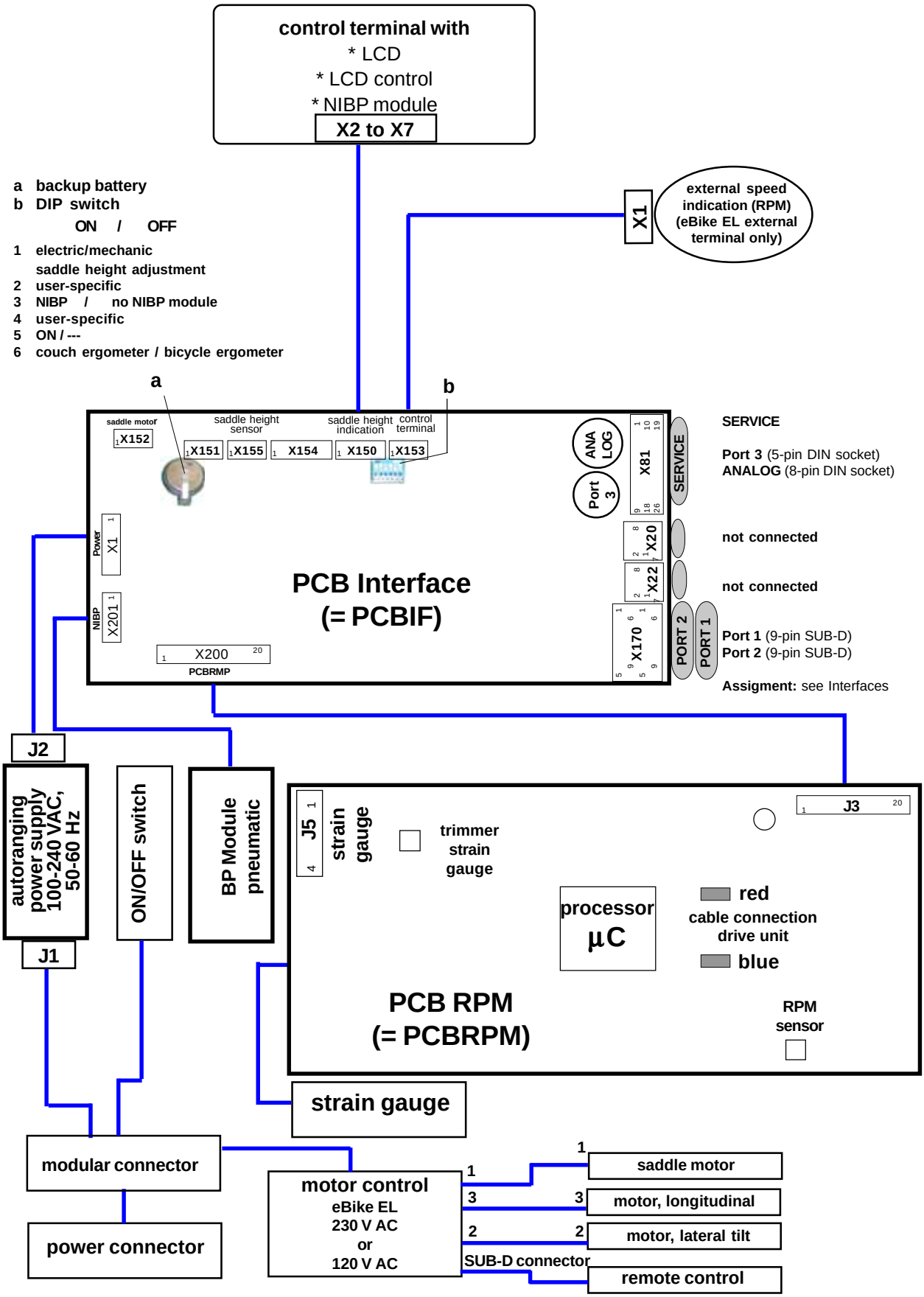


Figure C-5: Block Diagram eBike EL for RPM Board 1

C-1.6 Block Diagram eBike EL for RPM Board 2

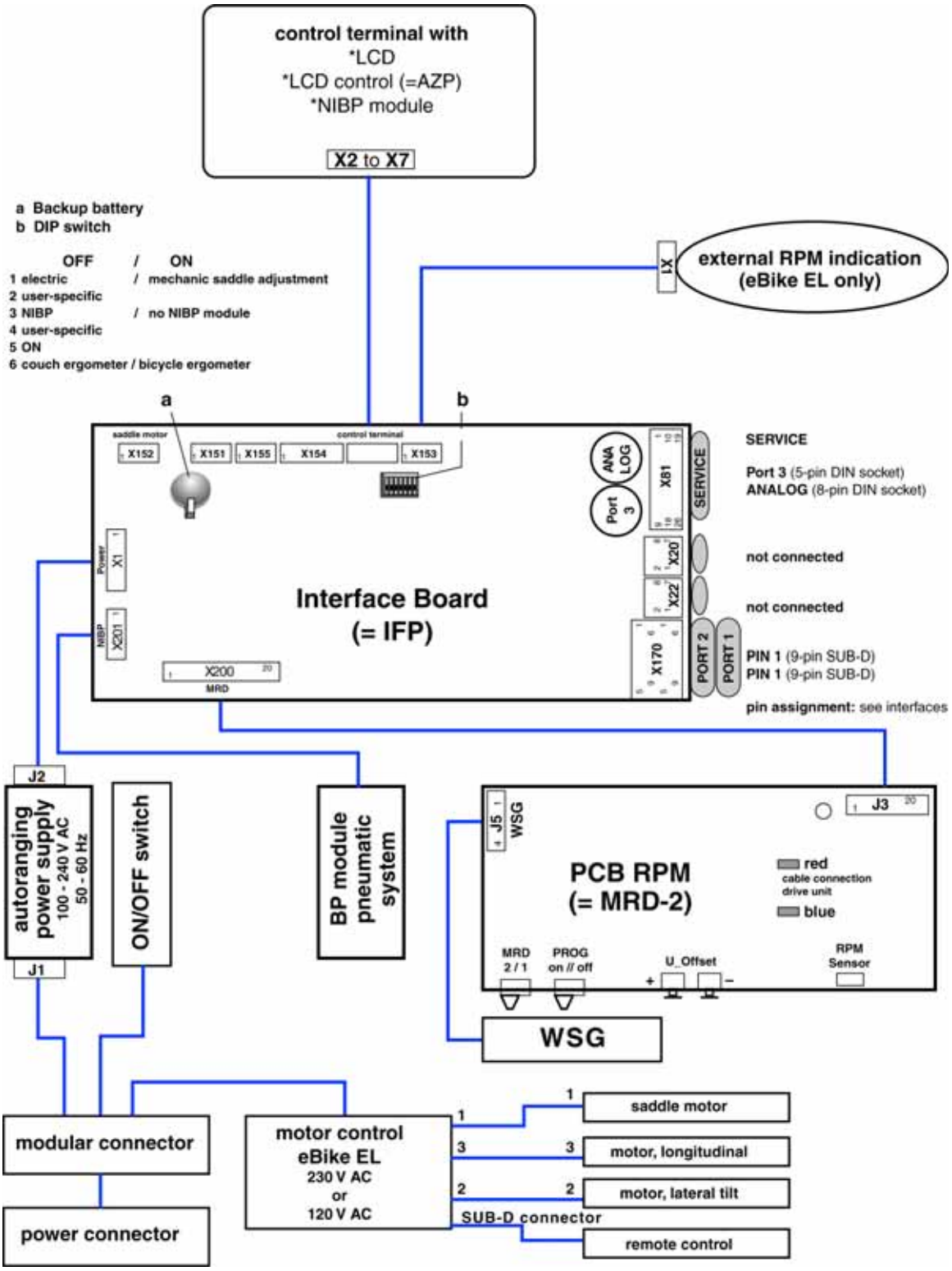


Figure C-6: Block Diagram eBike EL for RPM Board 2

C-2.1 Wiring Diagram eBike Basic / eBike Comfort

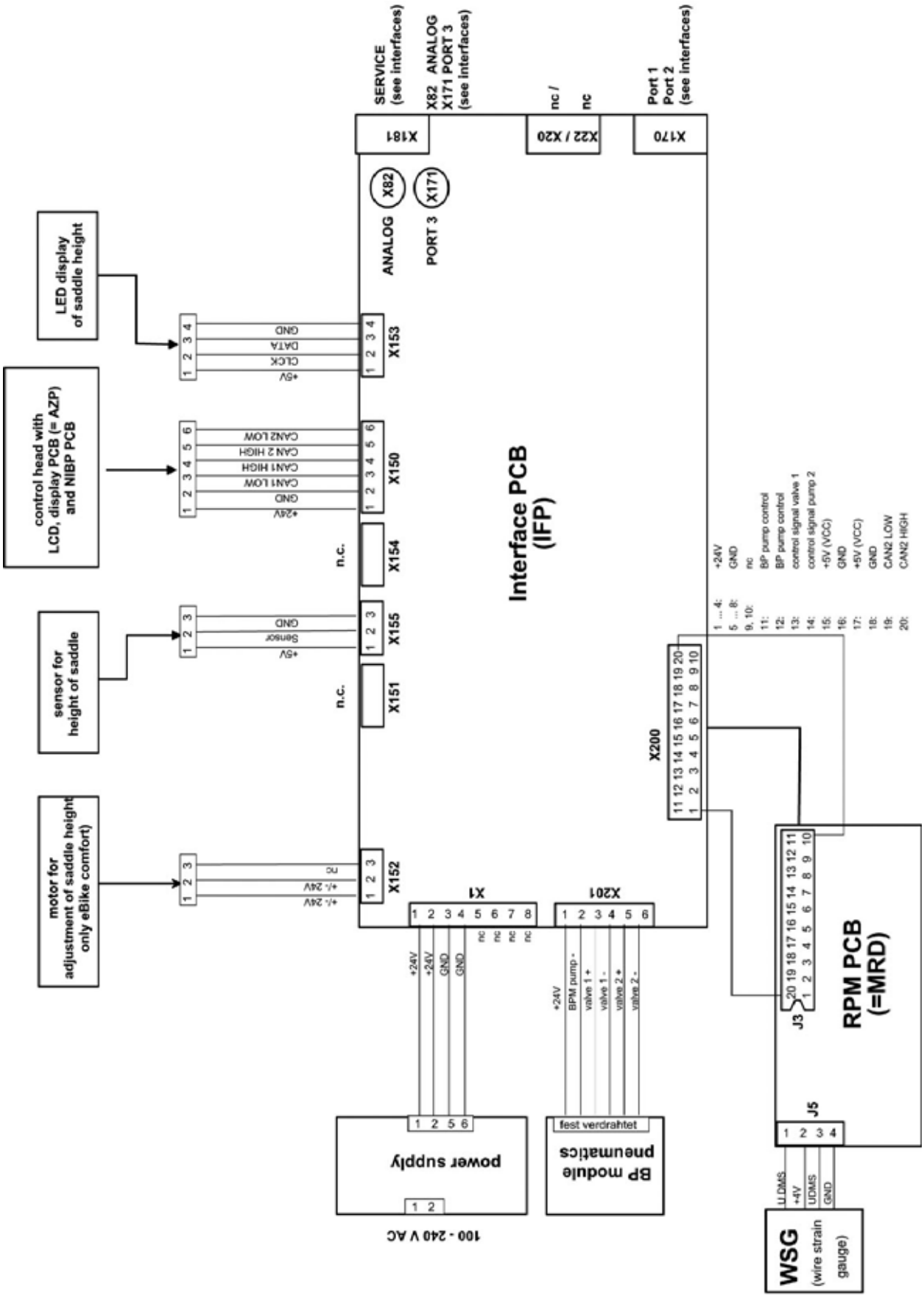


Figure C-7: eBike Basic / eBike Comfort Wiring Diagram

C-2.2 Wiring Diagram eBike L

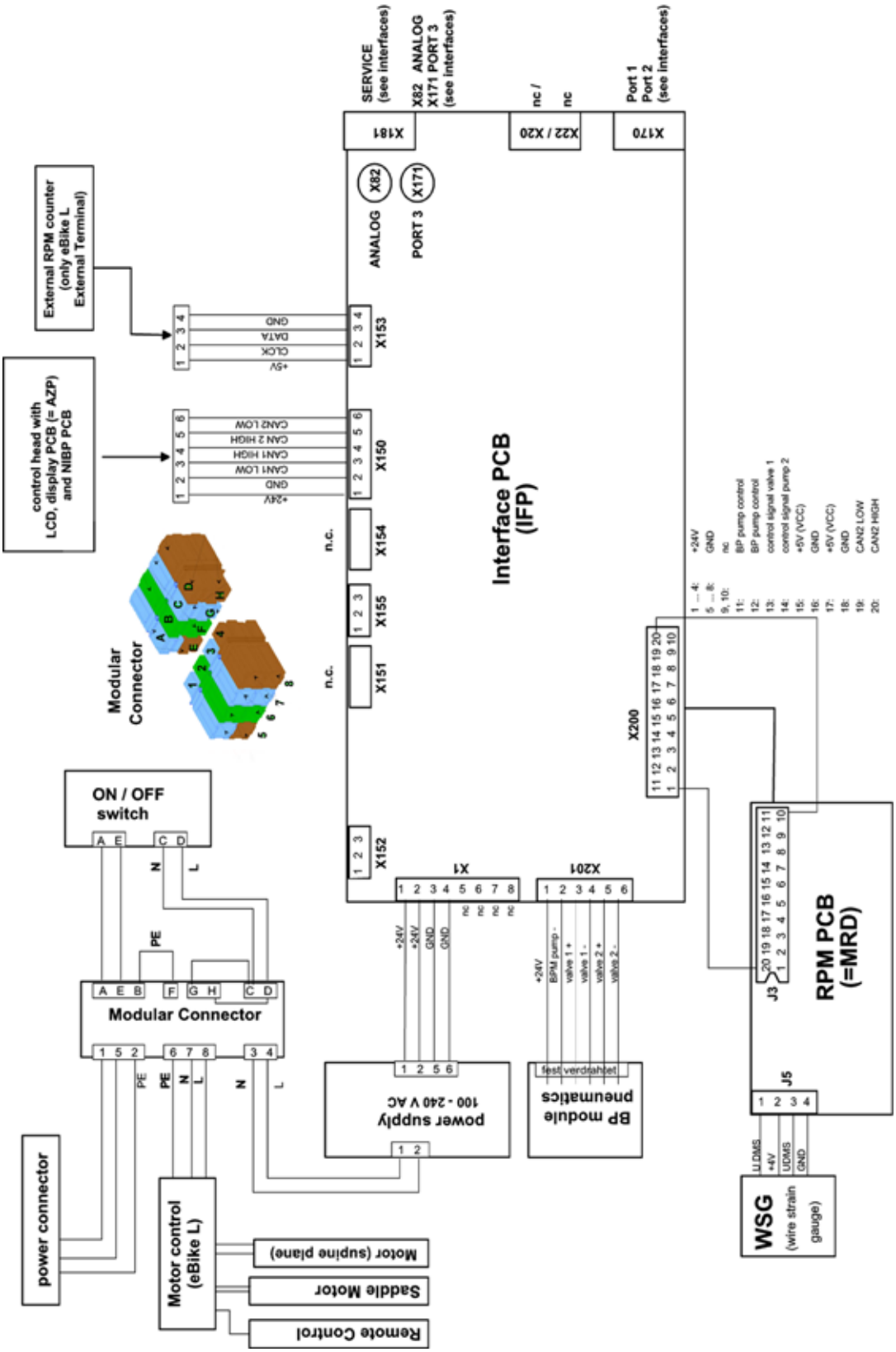


Figure C-8: eBike L Wiring Diagram

C-2.3 Wiring Diagram eBike EL

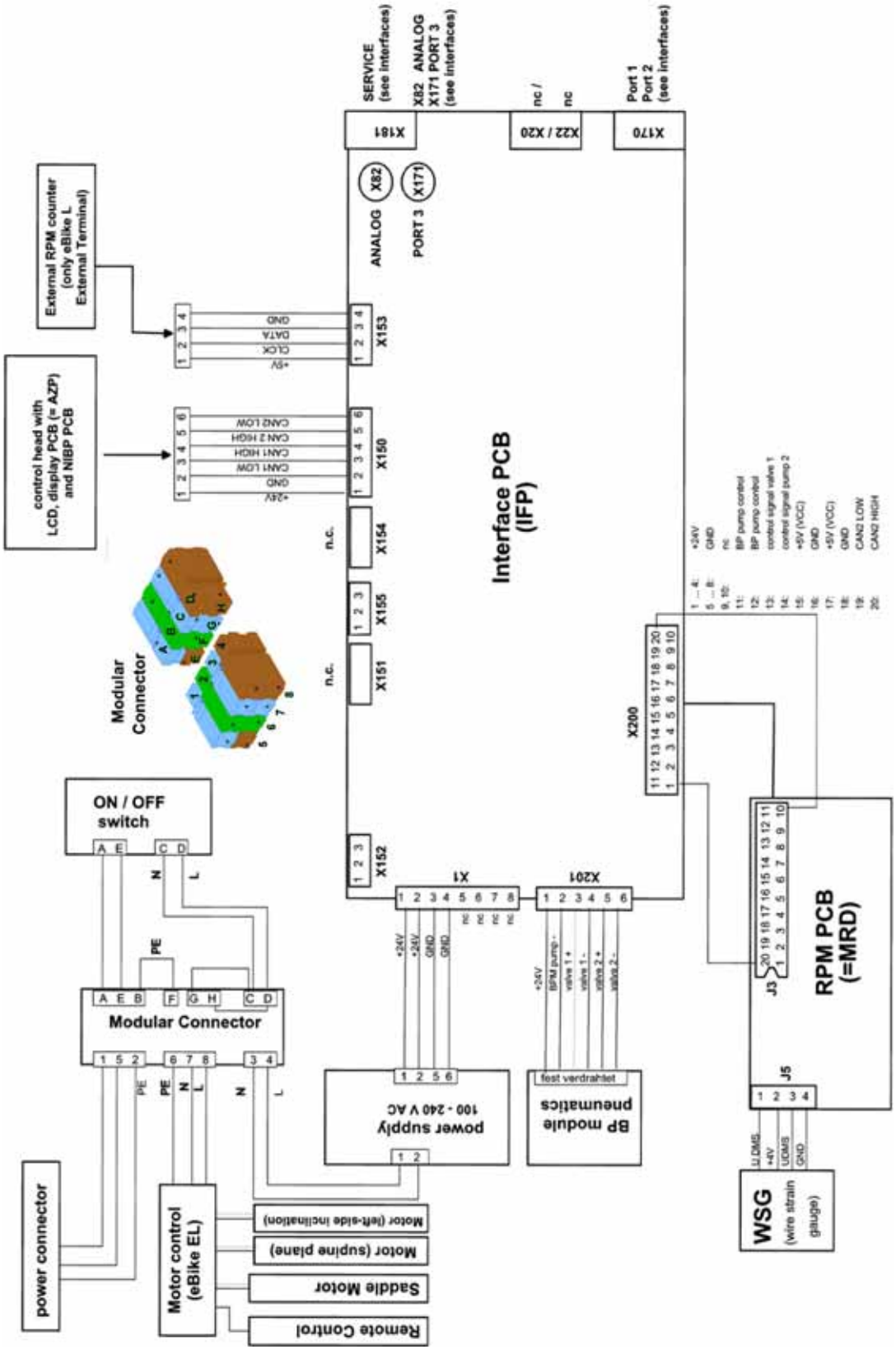


Figure C-9: eBike EL Wiring

C-3 Overview: PCBs eBike

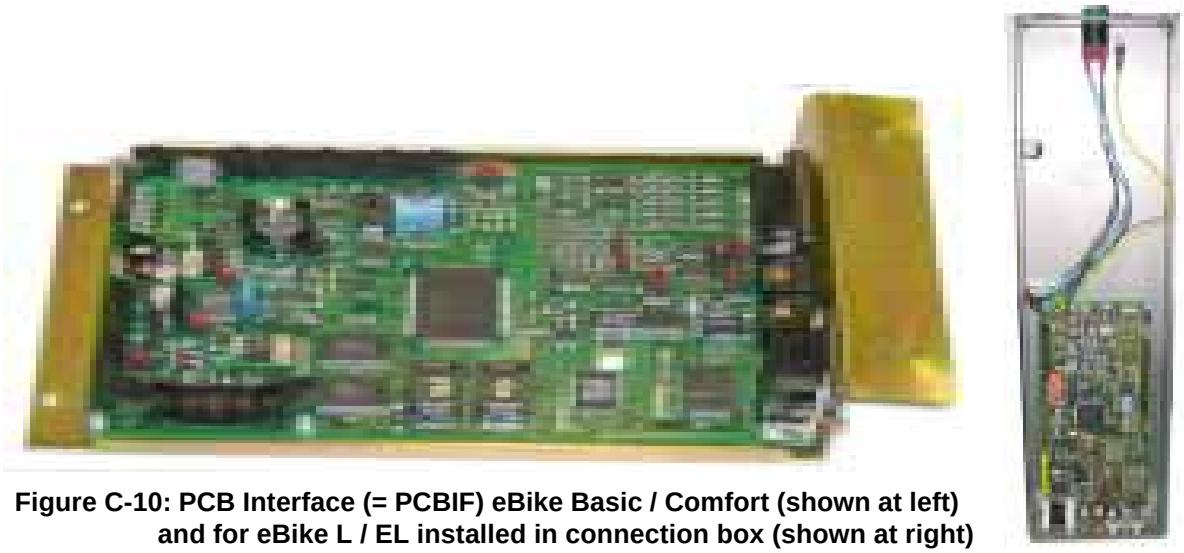


Figure C-10: PCB Interface (= PCBIF) eBike Basic / Comfort (shown at left) and for eBike L / EL installed in connection box (shown at right)

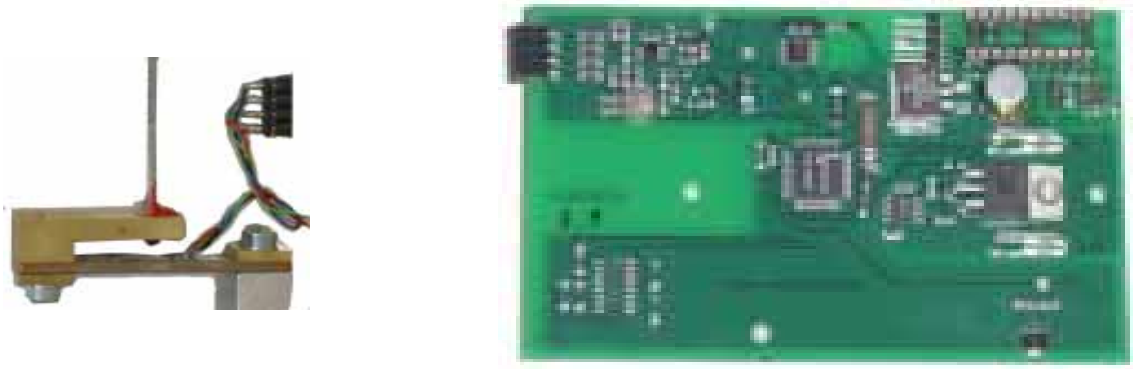


Figure C-11a: PCB RPM (= PCBRPM) eBike with strain gauge

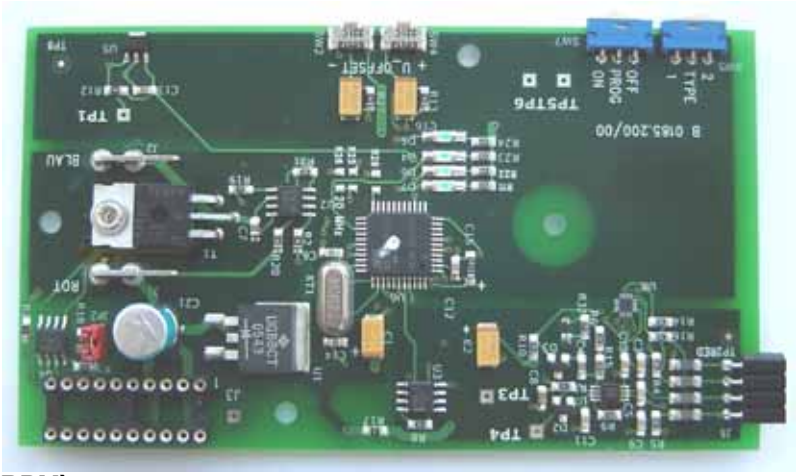


Figure C-11b: PCB RPM2 (= PCBRPM)

obsolete

obsolete

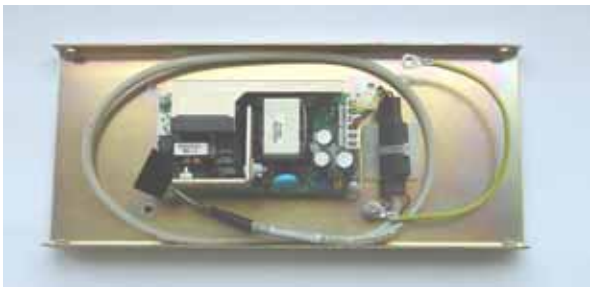


Figure C-12a: Power supplies eBike Basic / Comfort

replacement

Figure C-12b: Power supply eBike Basic / Comfort

obsolete

obsolete

Figure C-12c: Power supplies eBike L/EL

replacement

Figure C-12d: Power supply eBike L/EL

C-4. Overview: DIP Switch and Jumper Settings

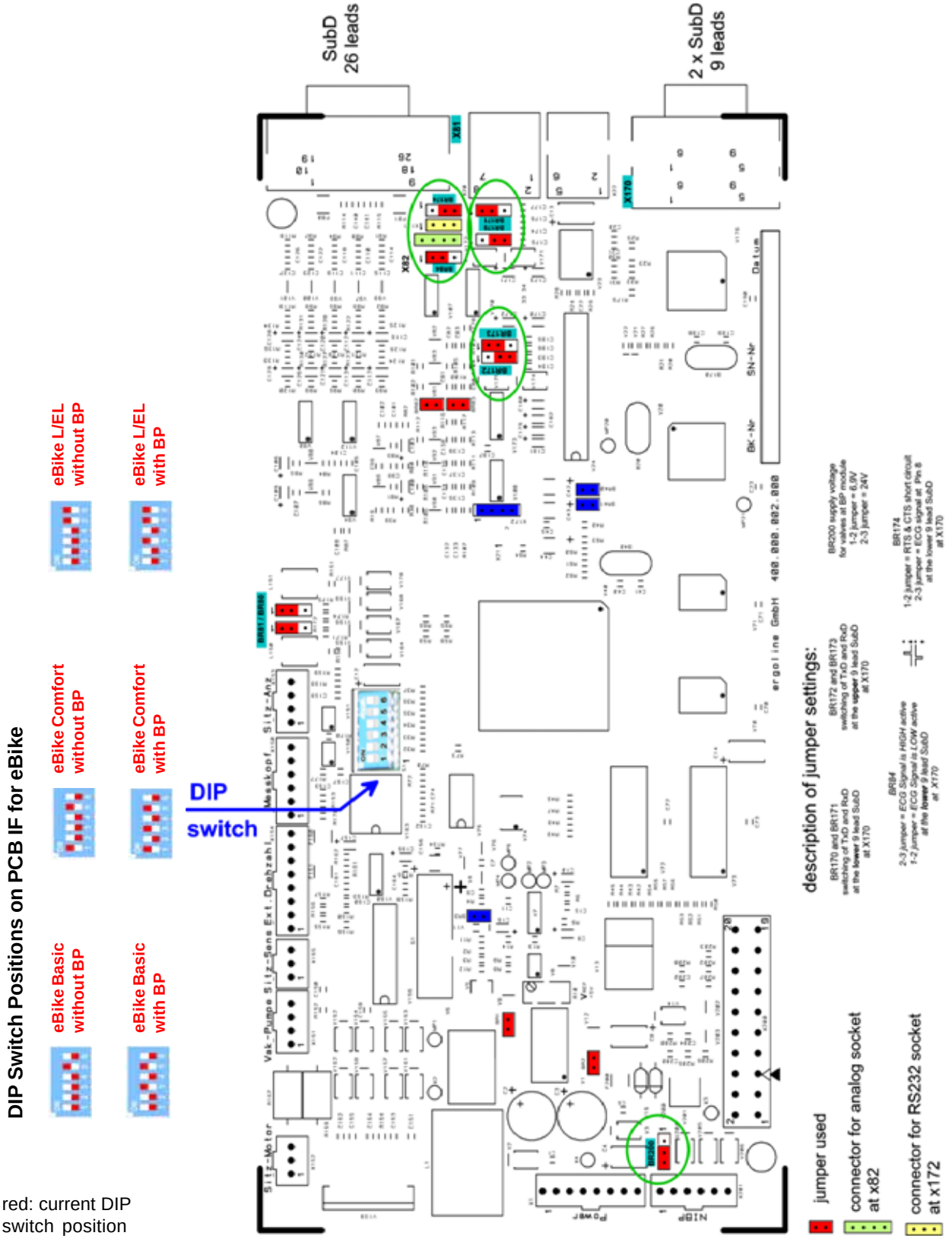

DIP Switch Positions on PCB IF for eBike
eBike Basic without BP
eBike Basic with BP
eBike Comfort without BP
eBike Comfort with BP
eBike L/EL without BP
eBike L/EL with BP
red: current DIP switch position
DIP switch
SubD 26 leads
2 x SubD 9 leads
description of jumper settings:
jumper used
connector for analog socket at x82
connector for RS232 socket at x172

Figure C-13: Overview: DIP Switch and Jumper Settings

Part D: Service Menu for eBike Basic / Comfort / L / EL

Note: The service menus are the same for both the Control Terminal PC and the Control Terminal PCplus. The menus shown below are from Control Terminal PC.

The Service Menu is only available in English.

Default Settings of Ergometer eBike

	eBike PC / PCplus
Settings Menu	
Default Mode	menu
Protocols	see Operator's Manual
Contrast	at optimum
Load change	+/- 5W
Language	German
Beep	On
Software Version	n/a
Date / Time	current values
EKG Type	Digital (Code 003)
RPM	Min: 54, Max: 65
Pulse Display	Off
Service Menu (Code 999)	
Baudrate	4.800 Baud
Load Calibration	n/a
Analog Comparison	n/a (20W=0.20V, 300W =3.0V
ECG-Startpulse	Leadtime: 10 sec
Pulsewidth:	100 msec
NIBP Parameter	Leadtime: 60 sec
Resting NIBP:	ON
Software Update	n/a
Error Codes	n/a
PC-Mode Automatic	Yes
Saddle Calibration	n/a
NIBP Calibration	n/a
NIBP Test	n/a
Ergometer Type	ER900

Note: To exit the Service Menu, switch off the eBike.

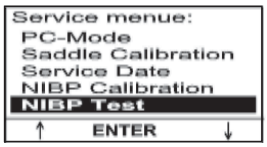
Service Menu (accessible with password only after ergometer has been turned on)

* Turn on the ergometer and simultaneously push the **NIBP** and **MENU** buttons during the ergometer self-test until the Service Code menu appears, prompting you to enter the service code.

* Using the arrow keys, enter the service code 999 and confirm entry with the softkey **ENTER**.
  When you entered a wrong service code, the message **!! Wrong Code !!** appears and the ergometer enters the normal mode. If this happens, turn the ergometer off and on again.

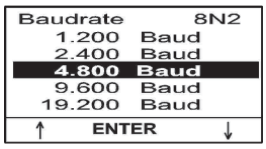
The menu offers the following items:

1. **Baudrate:** select baud rate for PORT 1
2. **Load Calibration**: use 8-kg weight and calibrate load
3. **Analog Comparison**: calibration for analog load control
4. **ECG-Startpulse**: adjust remote start for EKG unit
5. **NIBP Parameter**: adjust NIBP parameters
6. **Software Update**: update product software
7. **Error Codes**: not implemented
8. **PC Mode**: adjust PC mode
9. **Saddle Calibration**: saddle calibration (eBike Basic, Comfort only)
10. **NIBP Calibration**: calibrate NIBP system
11. **NIBP Test**: test NIBP system



1.Select baud rate:

available settings: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 baud



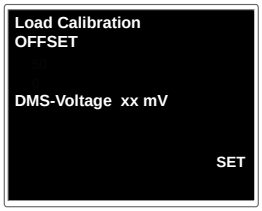
Note: Always select a baud rate of **4800 baud**.

2a. Load calibration eBike, eBike L, eBike EL of PCBRPM Board 1:

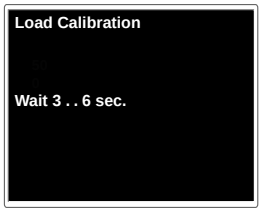
With software version FW1.6 the calibration procedure was redesigned. In principle the procedure is similar to the previous one, but now the technician will get more information and also more adjustments are possible.

Note: When using PCBRPM Board 2, please go to section 2b.

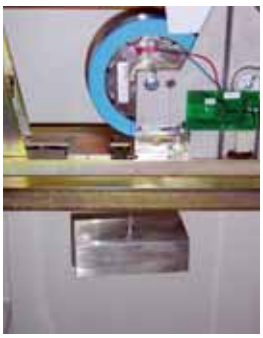
* Take the seat ergometer to an elevated position, e.g. between two solid chairs.
* Support the supine ergometer so that the load unit will be in a horizontal position.
* Display the service menu and select menu item „Load Calibration“.
  The screen shown at right appears.
  The **offset voltage** of the WSG measuring device is displayed. This voltage should be within a range of **60 mV to 80 mV**.
  If the value is not within that range, it should be adjusted by means of a potentiometer on the MRD board (see section E-2.3 under „RPM Board: Replacement and Adjustment Procedure“).

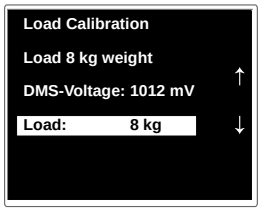


* Push softkey **SET** to confirm the value. A reset of the MRD board is performed and the current offset voltage is stored. This may take a few seconds.

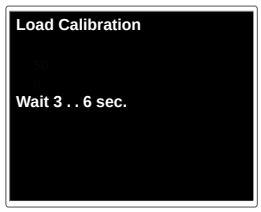


* When done, the screen shown at right appears. You are now asked to attach the 8 kg weight.
  The display shows the WSG voltage for that 8 kg weight. It must be **greater than 800 mV**.
  With the arrow keys, the displayed weight can be adjusted to 8 kg (range from 7 to 9 kg in steps of 0.1 kg). When you press an arrow key, the weight is displayed in reverse video.



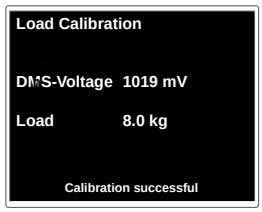


* This adjustment is accepted when pressing the **SET** key. The corresponding value will be stored. Wait for some seconds.

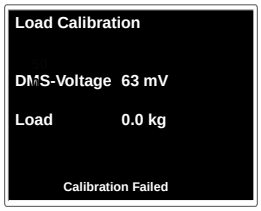


* Confirming the adjustment

  - After successful calibration a short beep sounds and the message „Calibration successful“ is displayed.



  - If calibration fails, a long beep sounds and the message „Calibration failed“ is displayed.



* Press the **Menu** key to exit the calibration mode and return to the Service menu.

* To exit the Service menu, you have to switch the ergometer OFF and ON again.
  Remove the weight before switching the ergometer on again.

Note: If you turn the ergometer on again and the weight is still attached, the error code E:02 will appear. The unit is locked and will not enter the normal operating mode.

2b. Load calibration eBike, eBike L, eBike EL of PCBRPM Board 2:

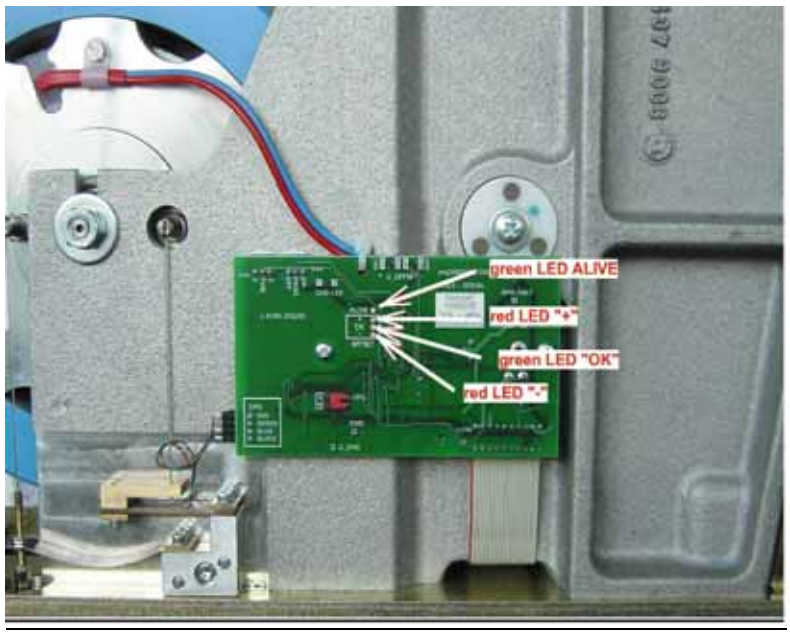
With software version FW1.6 the calibration procedure was redesigned.

* Take the seat ergometer to an elevated position, e.g. between two solid chairs.
* Support the supine ergometer so that the load unit will be in a horizontal position.
* Display the service menu and select menu item “Load Calibration“. The green LED “alive” is blinking.

  The screen shown at right appears.

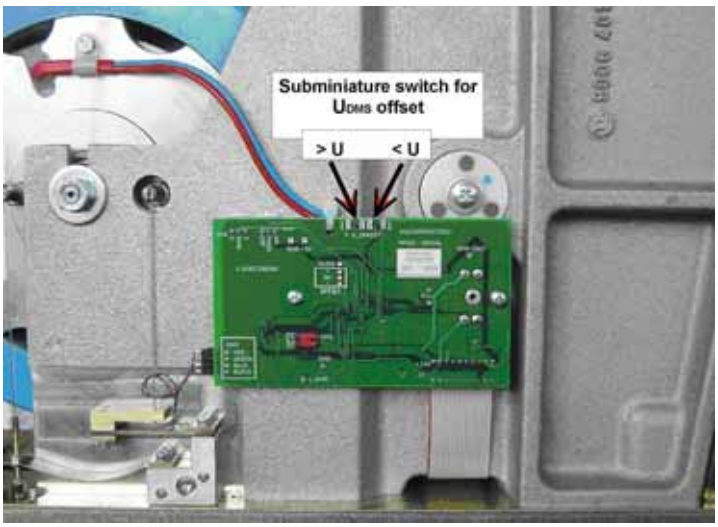
  The **offset voltage** of the WSG measuring device is displayed. This voltage should be within a range of **60 mV to 80 mV**.

Load calibration screen



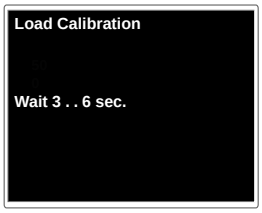
Red LEDs

If the value is not within that range (the red LED "+" or "-" is illuminated, it should be adjusted by means of the subminiature switches on the PCBRPM board 2.

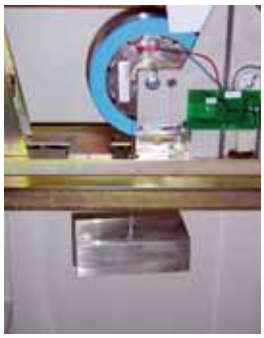


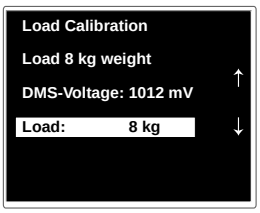
Subminiature switches

* Push softkey **SET** to confirm the value. A reset of the MRD board is performed and the current offset voltage is stored. This may take a few seconds.

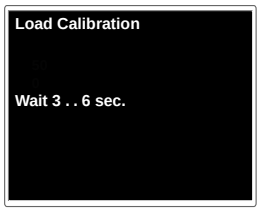


* When done, the screen shown at right appears. You are now asked to attach the 8 kg weight.
  The display shows the WSG voltage for that 8 kg weight. It must be **greater than 800 mV**.
  With the arrow keys, the displayed weight can be adjusted to 8 kg (range from 7 to 9 kg in steps of 0.1 kg). When you press an arrow key, the weight is displayed in reverse video.



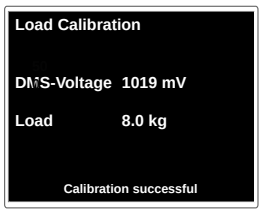


* This adjustment is accepted when pressing the **SET** key. The corresponding value will be stored. Wait for some seconds.

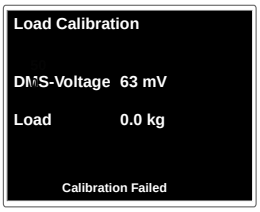


* Confirming the adjustment

  - After successful calibration a short beep sounds and the message „Calibration successful“ is displayed.



  - If calibration fails, a long beep sounds and the message „Calibration failed“ is displayed.



* Press the **Menu** key to exit the calibration mode and return to the Service menu.

* To exit the Service menu, you have to switch the ergometer OFF and ON again.
  Remove the weight before switching the ergometer on again.

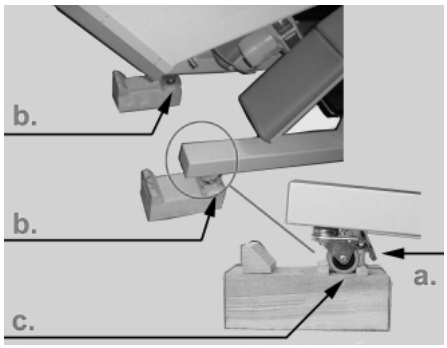
Note: If you turn the ergometer on again and the weight is still attached, the error code E:02 will appear. The unit is locked and will not enter the normal operating mode.

2.b Load Calibration eBike L / eBike EL:

Note: Additional accessories required for load calibration of eBike L / eBike EL:

- 1x calibration stay for eBike L / eBike EL
- 2x calibration support for eBike L/EL
  (P/N 2018111-134 SPARE EBIKE L&EL SUPPORT FOR CALIBRATION)
- 8-kg calibration weight for eBike L / eBike EL
  (P/N 2018111-135 SPARE EBIKE L&EL CALIBRATION WEIGHT 8KG)
- 2nd persons to assist in lifting the couch ergometer

1. Place the ergometer on a level surface and put it into operation.
2. Set the back rest of **eBike L** to an angle of 45° (semi-recumbent position), using the remote control.
   Adjust **eBike EL** to a lateral tilt of 0°, using the remote control. Then set the back rest to an angle of 45° (semi-recumbent position).

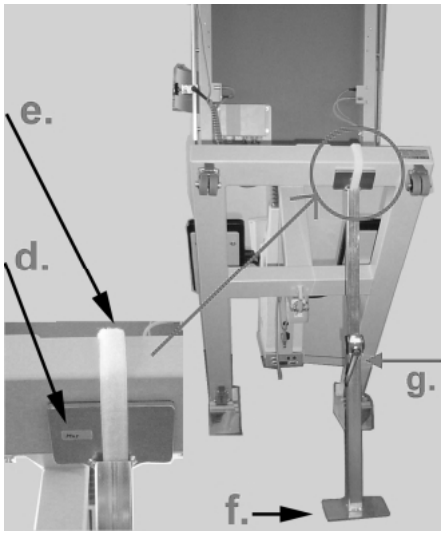


3. Turn the front castors of eBike L/EL to the back and lock the castor brakes (see arrow **a.** in illustration).

   To begin with, lift the **eBike L/EL** at the front, left hand side and place the calibration support under the left castor (see arrow **b.** in illustration).
   Then lift the **eBike L/EL** at the front, right hand side and place the calibration support under the right castor.
   Caution: The castors must be located between the two border strips (see arrow **c.** in illustration).

4. Extend the calibration stay to approx. 835 mm and lock.
5. Hang the hook of the calibration weight adapter into the eye of the strain gauge return spring and let hang.
6. With the aid of an assistant, lift the couch ergometer eBike L / EL at the back of the base and position the calibration stay labelled **„rear“** (see **d.** in illustration) to the right of the center brace below the transverse frame.
   Attach the calibration stay to the base, using adhesive tape (see **e.** in illustration).
   Lift the base a little and wait for the calibration stay to stop swinging.

   Caution: Place a weight (e.g. the tool chest) on the base plate of the calibration stay.
   Caution: Make sure that both sides of the transverse frame sit in the calibration stay and that the stay itself is in a stable position.



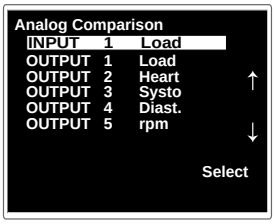
7. With the aid of the calibration stay, align the bottom edge of the connection box exactly horizontal.
   To do so, open clamping lever **g.** (see item 6) and adjust top section.

8. Perform calibration (see also section 2.a).

a. Select menu item **„Load Calibration“** and follow the load calibration instructions given in section 2.a.

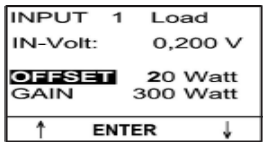
3. Calibration of the analog input and outputs:

* Connect ergometer to EKG unit with analog load control.
* Select menu item **Input 1 Load** (outputs 2 to 5 are not used).

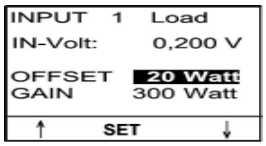


3.a Calibration of input for analog load control

* „**IN-VOLT** indicates the input voltage level.
* Select output for low load setting, i.e.
  20 Watt at the **ECG unit**
  and
  set **OFFSET 20 Watt** at the **ergometer**.

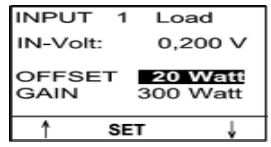


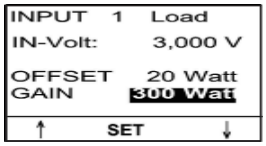
* Confirm setting „**OFFSET**“ with „**ENTER**“ .
* Wait for the displayed voltage to stabilize.
* Confirm current setting, e.g. 20 Watt with „**SET**“.
* The current setting is saved.



Perform the setting for the high load value in the same way.

* Select output for high load setting, i.e.
  300 Watt at the **EKG unit**
  and
  set **GAIN 300 Watt** at the **ergometer**
* Confirm setting „**GAIN**“ with „**ENTER**“. .
* Wait for the displayed voltage to stabilize.
* Confirm current setting, e.g. 300 Watt with „**SET**“.
* The current setting is saved and calibration of the analog load input is terminated.

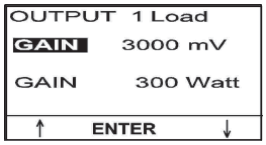




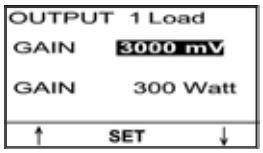
OFFSET: range from 20 to 1000 Watts in steps of 10 Watts
GAIN: range from 20 to 1000 Watts in steps of 10 Watts

3.b Calibration of output for analog load

In order to calibrate the analog load output the ergometer output voltage, e.g. **3000 mV** and the corresponding power value, e.g. **300 Watts** are set at the ergometer. Select requested setting (see 3.a) and confirm with “**SET**“.



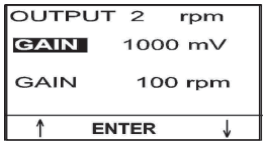
GAIN: range up to 3000 mV in steps of 10 mV
GAIN: range from 20 to 1000 Watts in steps of 10 Watts



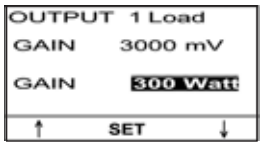
Note: The calibration of the analog load output signal can only be verified, after the Service Menu has been terminated. The analog output signal can be checked after starting an ergometry test.

3.c Calibration of output for analog RPM

In order to calibrate the analog RPM signal the ergometer output voltage, e.g. **1000 mV** and the corresponding RPM value, e.g. **100 rpm** are set at the ergometer: Select requeting setting (see 3.a) and confirm with "**SET**".

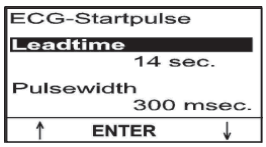


GAIN: range up to 1000 mV in steps of 10 mV
GAIN: range from 30 to 130 rpm in steps of 10 rpm



4. EKG remote start

Leadtime is the lead time for the EKG remote start signal, i.e., when the implemented exercise protocols control the ergometer, these protocols trigger the remote start signal before a load change.



Pulsewidth indicates the width of the remote start pulse.

range from 1 to 30 seconds in steps of 1 second
range from 100 to 1000 ms in steps of 100 ms

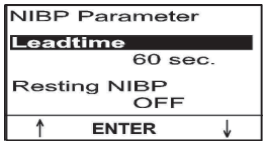
5. NIBP Parameter

Leadtime determines the lead time of a BP measurement before a load change when the ergometer is controled by the implemented exercise protocols (WHO, Hollmann, ...).

range from 40 to 90 seconds in steps of 1 second

Resting NIBP determines whether or not a BP measurement will be performed before the ergometry is started. This setting only effects the "ergometry" mode. Preferred and default setting is "ON"

range OFF - ON



6. Software Update

Note: If the eBike has the serial no range beginning with:
2004000268 up to 2004001139
The Flash Eprom in the eBike Terminal has to be replaced. The Software Version 1.2 or higher is only running with the new Flash Eprom. eBike's with serial no higher 2004001139 has already this new Flash Eprom implemended.
For update the Flash Eprom please order update Kit **2018111-058 SPARE EBIKE FLASH UPDATE KIT**. This update Kit includes also the update instruction.

Note: Software updates are performed via the RS232 interface of a PC, using a special update program.
A null modem cable, e.g. 223 362 03 between PORT 2 (9-pin SUB-D socket at ergometer) and the RS232 interface at the PC is required for the update.

The program **will not work** if a **USB <-->RS232 converter** is used to simulate the RS232 interface.

The update program works with the following operating systems: **WIN2000, WIN NT4, WIN XP (recommended: PC with 1 GHz or more).**

Note: Use only the COM 1 port.

* Using the null modem, connect the ergometer (**PORT 2**) to the PC (**COM 1**).

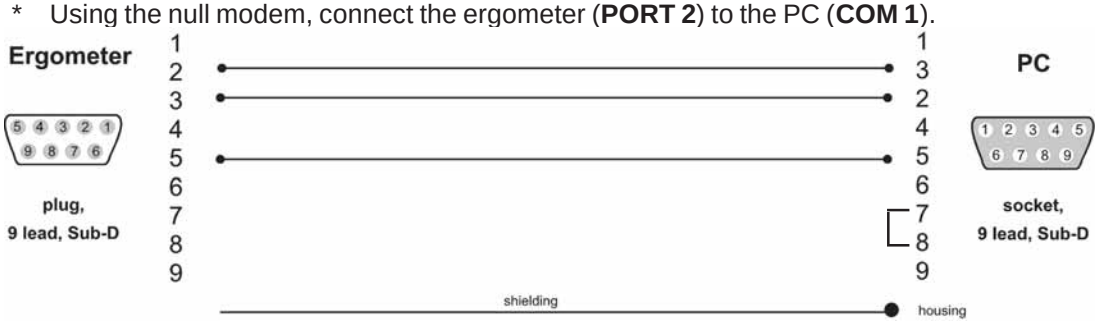
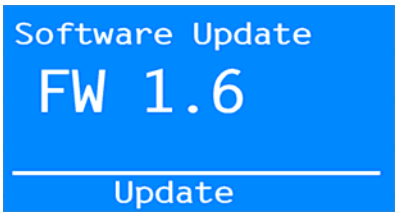


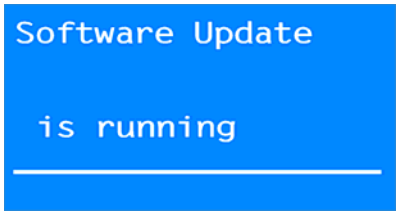
Figure D-1: Pin assignment for software update

all **eBikes**
Firmware FW1.8 is used.
Copy the update program 2020259-009 SW FIRMWARE EBIKE FW18.zip to a directory on the PC (e.g. C:\Update_eBike), unpack the file and save the corresponding update files to the same directory.



Note: The Software file cannot be ordered. Please download this file from the Service Homepage.

* Switch on eBike and select Service menu.

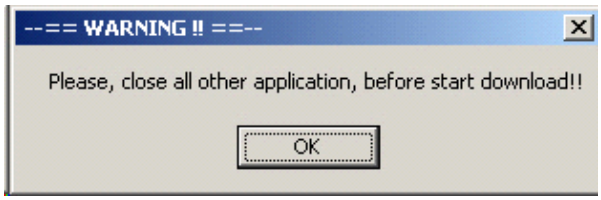


eBike: Select menu item **Software Update** in the service menu (the display shows the current software version) and activate update process with the softkey **UPDATE** at the ergometer first.
"Software Update is running" is displayed at the ergometer

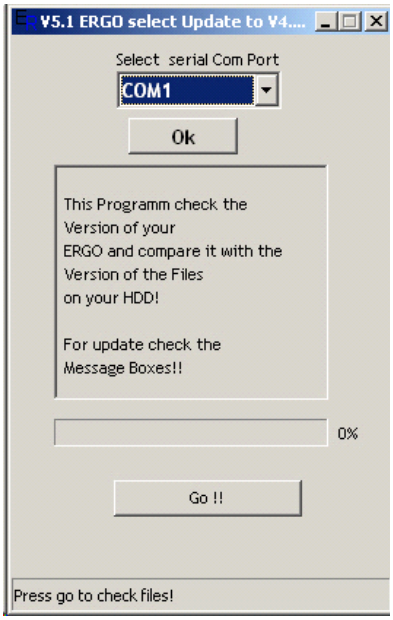
PC: Open the update program **ERGOselect.exe**

.

PC: Close all applications and confirm the message with "OK".



PC: Select the serial COM port and confirm with "OK“. Then activate the update with "Go".

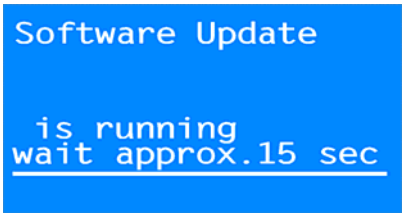


When the communication link has been established, a blue progress indicator indicates the file transfer. The modules IFP, AZP, MRD, NIB, MED will be transferred sequentially. Depending on the PC performance, the transfer may take a few seconds up to approx. 1 minute.

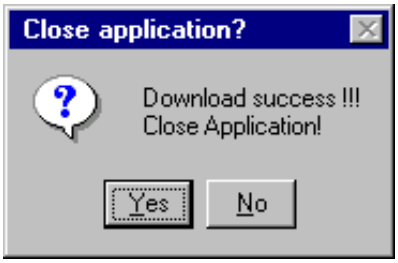
eBike: **Note:** When the AZP download starts, the beeper may sound for some time.

eBike: **Note:** During the AZP download, the message “AZP BOOTL. V2.1” is displayed. After completion of the AZP download, the message “AZP READY !” is displayed during the remaining update process.

eBike: **Note:** After completion of all modules IFP, AZP, MRD, NIBP the message "Software Update is running - wait approx. 15 sec" is displayed.
Don't switch off the ergometer.



PC: Once the update has been completed, the message “**Download success !!! Close Application !**” will appear. Confirm the message with “**Yes**”.



ebike: Note: After the update is complete the message "Software Update - FW 1.8 - Update finished - Switch off power" is displayed.

eBike: After a successful update, turn the ergometer off and on again and check the software version in the menu - Software Version FW 1.8.

Note: During the software download procedure, please do not switch off the eBike and PC and do not disconnect the download cable.

Note: If the update is unsuccessful, it can be repeated. If a failure happens while the file MRD download is in progress and the eBike is switched off, follow the “Update Troubleshooting” or replace the complete PCB RPM, part no 2018111-034.

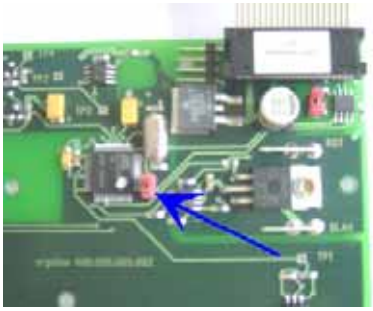
Note: If the second attempt falls as well, we recommend to proceed according to “Update Troubleshooting”:

Note: The new RPM 2 Board works only with software FW1.6 and higher.

Important:

No downdates are permitted once version FW 1.8 has been installed!

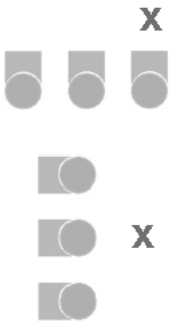
Update Troubleshooting

Problem	Cause	Remedy
PCBRPM 1: During the update the software application for the RPM board is not correctly transmitted. After restart of the ergometer the error code E:93 appears.	The update of the RPM software was interrupted.	The RPM board must be dismounted. A jumper must be plugged on the wrap connection (see picture below) and the RPM board must be mounted.  Restart the software update (see step 6). The start of the RPM board download required a long time (min. 25 s). After finishing the download the jumper must be unplugged.
PCBRPM 2: During the update the software application for the RPM board is not correctly transmitted. After restart of the ergometer the error code E:93 appears.	The update of the RPM software was interrupted.	Open the top cover (see section B-2.1). Set the miniature switch to the “PROG ON” position (see picture below). Restart the software update (see step 6). The start of the RPM board download required a long time (min. 25 s). Set the miniature switch to the “PROG OFF” position (see picture above) after finishing the download.

Problem	Cause	Remedy
The update does not start: Upon starting the update with **"GO!!"** the blue update progress indicator does not appear in the startup window.	a. Wrong update cable b. PC does not meet the recommended specifications	a. Check update cable b. Use suitable PC, connect cable to COM 1 interface
The update program will not start	COM 1 used by another application	Close down application that is using COM1.
Message "**MRD must exist**" appears.	a. The required file "**MRD_Vxxx.hex**" is not found in the update directory. b. No update required. c. MRD board has not been updated.	a. Copy required file to the update directory. b. Acknowledge message with OK. c. Acknowledge message, then repeat update, updating MRD only.
Message "**Download Success**" does not appear.	a. Communication between PC and ergometer has been interrupted during the update	a. If the ergometer continues to display the message „**Updating"**, restart the update **without turning the ergometer off**.
When turned on, the ergometer LCD displays the message "**AZP Ready**".	Ergometer has been turned off during the update, before the update had been successfully completed.	Repeat update (ergometer is automatically in the update mode).
Message "AZP must exist. Programm terminated." and "MRD must exist. Programm Terminated." appear during the update process on PC.	Previous update was not completed successfully.	Acknowledge both messages with „OK". Close program on PC and restart the complete update process once more.
After startup of the ergometer, the ergometer BP pump automatically starts and runs continuously (in devices with the BP option) or the ergometer does not function properly (no speed indication, no load on pedals).	During the update of the MRD software the data stream has been interrupted (device turned off, power failure, disconnected data line, abortion of software update)	- invalid MRD version: replace PCB RPM
No information displayed on ergometer control terminal, only the illumination is on.	During update of the IFP software the data stream was interrupted (device turned off, power failure, disconnected data line, abortion of software update)	Repeat update (ergometer is automatically in the update mode).
Power failure during Nibp or Med1 update.	Invalid NIBP or MED1 version in ergometer	Replace terminal
The update software reports an error during Nibp or Med1 update.	Incorrect transfer of data packets.	Do not turn off ergometer and repeat update.
E90...E93	Software modules not compatible.	Perform software update

Note: The **Software Update** menu displays the implemented software version, **FW 1.8**
In addition, you can display a detailed overview of the software versions of all installed modules.
Follow these steps to view the detailed software overview from the **Software Update** menu.

PC Control Terminal: push bottom right softkey
PCPlus Control Terminal: push middle softkey on the right



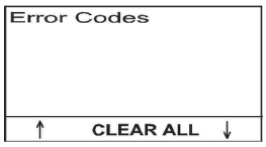
Example of a detailed overview of the software modules

Software Module FW1.8
IFP: Rev: 5.00
AZP: Rev: 5.10
MRD: Rev: 5.20
NIBP: Rev: 1.58 (only on systems with **NIBP** option)

7. Error Codes

This function is currently not available.

Note: Error Code E:01 will be displayed after switching on the eBike, when the cuff was moved during self-test. In this case the amplifier cannot be initialized and the eBike has to be started again. E:01 will not be recorded and will not appear here.



Note: If the error code E:01 appears again, even though the cuff was not moved, the BP module is probably defective. To be able to run an exercise test without the BP module, disable the blood pressure DIP switch (see Figure C-6 DIP Switch and Jumper Settings).

Error Code E: 02 = MRD, offset or gain error

If a module version is detected that is not compatible with the installed software package, the boot procedure will be aborted with one of the following error codes:

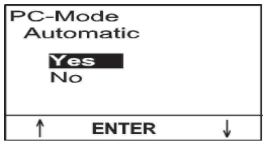
Wrong software in **IFP** board: the boot procedure is aborted and the error code **E:90** displays.
Wrong software in **AZP** board: the boot procedure is aborted and the error code **E:91** displays.
Wrong software in **NIBP** board: the boot procedure is aborted and the error code **E:92** displays.
Wrong software in **MRD** board: the boot procedure is aborted and the error code **E:93** displays.
If the **NIBP** software does not works correctly during the regular use of the ergometer, the error code **E:10** displays.
If the **MRD** software does not work correctly during the regular use of the ergometer, the error code **E:20** displays.

Note: During the boot procedure, the software is checked in the above order. The procedure is aborted, when the first incompatible software is detected. Only the first detected mismatch is indicated, i.e., the remaining modules are not checked.
Remedy: Install software FW1.8 again as described in section 6.

8. PC Mode „Automatic“

With the setting **Automatic** „**Yes**“, the ergometer will enter the **PC Mode** (digital or analog mode) from any operating mode upon detection of a valid signal.

With the setting **Automatic** „**No**“, the ergometer will not automatically change its operating mode. This means that you must select the **PC Mode** (digital or analog mode), if you wish to use it.

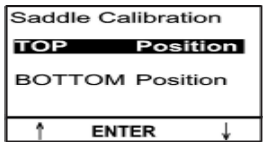


Note: If the ergometer is controlled by an external EKG unit (serial or analog/serial control), always select the setting Automatic “Yes”.

9. Saddle Calibration (eBike Basic/Comfort only)

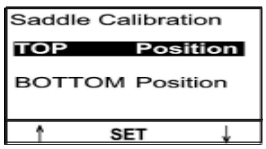
The saddle calibration determines the display range (scale from 1 to 40) of the digital saddle height indication.

Select menu item **TOP Position** and confirm with softkey **ENTER** (with **eBike comfort** only).



Move saddle to the top position (normally 36 cm above the top edge of the saddle guide).

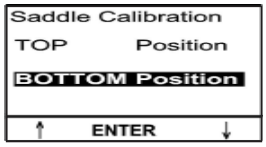
Confirm setting with **SET**.



Select menu item **BOTTOM Position** and confirm with softkey **ENTER** (with **eBike comfort** only).

Move saddle to the bottom position (normally 6.5 cm above the top edge of the saddle guide).

Confirm setting with **SET**.



10. NIBP calibration

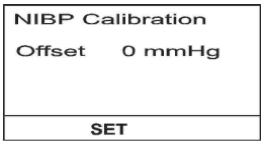
* Using the softkeys, choose menu item **NIBP Calibration** in the **Service** menu and confirm selection with software key **Select**.

The NIBP calibration menu appears.

1. **2.**

* **Zero Adjustment**:

During zero adjustment, no pressure must be applied to the cuff connection at the control terminal.



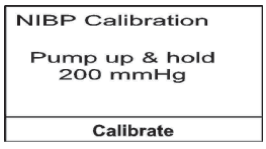
Note: An adapter nipple (e.g. with an open short length of tubing) unlocks the cuff connection at the control terminal.

The display shows the current pressure value,

e.g. **Offset at 0 mmHg**.

Initiate zero balancing with the softkey **Start**.

Upon zero calibration, you can calibrate the system at 200 mmHg.



NIBP calibration: calibration at 200 mmHg

Calibration:

Connect pump and calibrated pressure meter to cuff connection. Depending on the equipment used, you may need a T-adapter to connect the pump and the pressure meter to the control terminal.

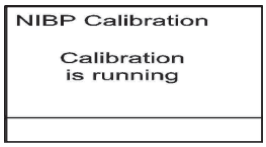
Using the pump of the pressure meter, apply a pressure of exactly 200 mmHg as displayed.

Initiate the calibration with the softkey **Calibrate**.

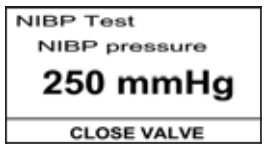
NIBP calibration: Calibration is running

During calibration, you will see the message **Calibration is running**.

At the same time the pressure Value on the NIBP measure Instrument decreased down to 0 mmHG.



An audio signal indicates the end of the calibration procedure and the **Service** menu reappears.



Note: According to the German Medical Device Act (MPG), only GEMS IT authorized personnel is allowed to calibrate the NIBP system.

Note: eBike L / eBike EL have the cuff connection on the right or left of the couch.

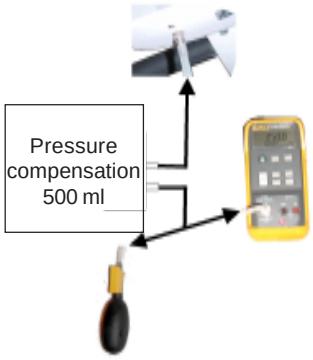
11. NIBP Test

Use a pump to apply pressure from outside.

The current pressure value will be displayed.

Compare the pressure values indicated on the control terminal and on the display of the pressure meter.

The max. approved tolerance of the pressure readout is +/- 3mm Hg (see section Functional Test).

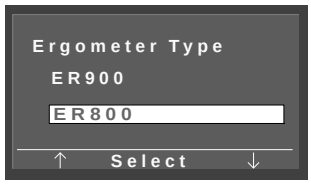


Note:
If the pressure reaches 320 mmHg, the safety valve will be activated. In this case the safety valve can be closed again by pressing the button "Close Valve" to continue the NIBP test

12. Ergometer Type

Appears only when no NIBP (non-invasive pressure) module is installed.

For communication with GE electrocardiographs, select ER900.



Part E: Drive Unit

E-1. Drive Unit - Mechanical Design

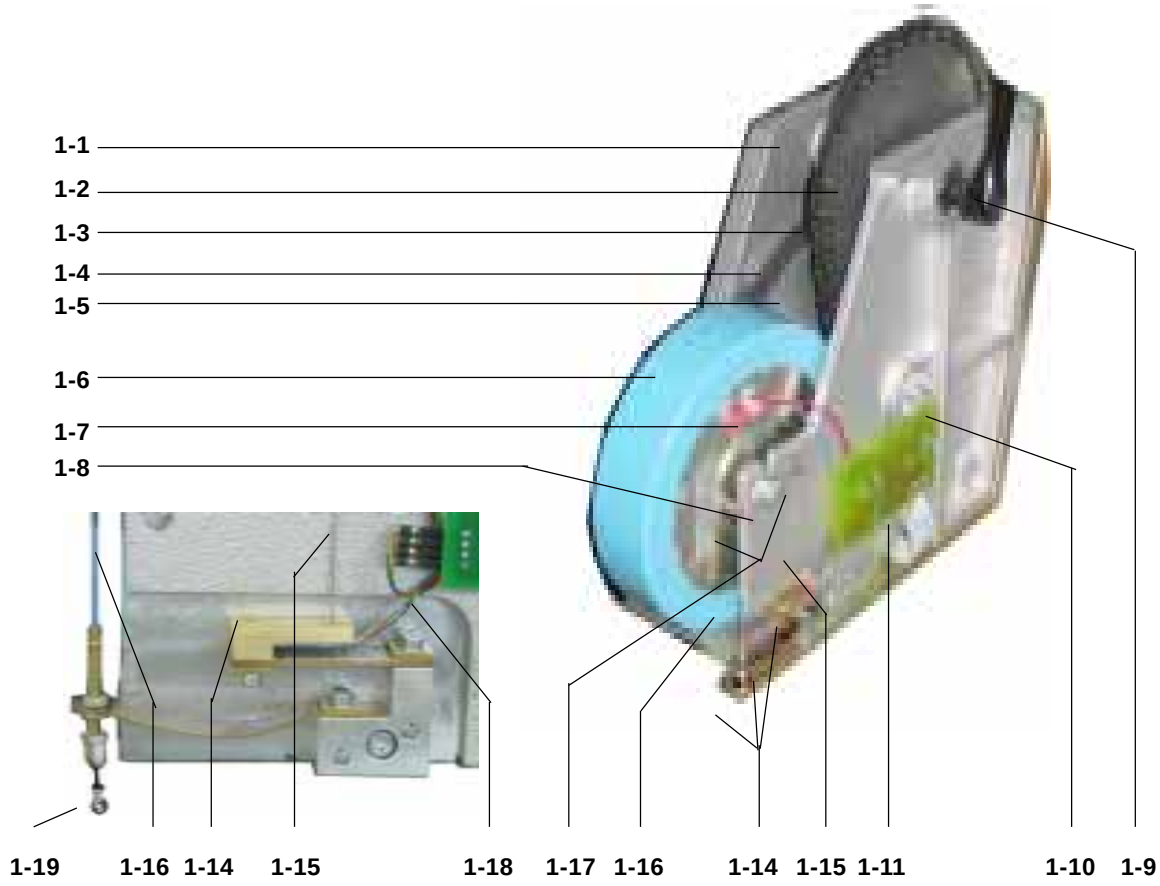


Figure E1: Mechanical Overview: Load Unit with PCB RPM and Strain Gauge

Item No.	Part No.	Description
1-1	-	Aluminum die cast housing of load unit
1-2	-	Sprocket disk
1-3	-	Roller chain for load unit, type eBike
1-4	-	Powergrip toothed belt
1-5	-	Powergrip disk for toothed belt
1-6	-	Eddy-current brake
1-7	-	Power supply for eddy-current brake
1-8	-	Fixture for eddy-current brake
1-9	-	Pedal axle
1-10	-	Free-wheel axle with magnet for RPM determination
1-11	-	PCB RPM with RPM sensor
1-14	-	Strain gauge for eBike series, complete kit
1-15	-	Micro rope for strain gauge, type eBike
1-16	-	Micro rope for strain gauge, type eBike
1-17	-	Pins fastening the two micro ropes to the eddy-current brake
1-18	-	4-pin connector to PCB RPM
1-19	-	Hook for calibration weight
—	-	Load unit type eBike, complete kit with strain gauge and PCB RPM

The **drive unit** is located in a rugged, die-cast aluminum housing. The drive and free-wheel shafts are made of hardened and ground steel. They are located in deep groove ball bearings both ends of which are covered. Within the drive unit the distance between axes has been chosen so as to make adjustments superfluous.
Guard rings secure the **drive shaft** in the bearing receptacles. On both sides the bearings are secured with a Loctite bond. The sprocket is secured with guard rings on the drive shaft.

On both sides the **free-wheel shaft** is located in deep groove ball bearings and guard rings secure the seating of the shaft. The bearings are additionally secured with a Loctite bond. On the free-wheel axle the disk for the toothed belt and the sprocket are secured with guard rings. The generator disk for RPM measurement is screwed to the protruding end of the free-wheel shaft.

The **eddy-current brake** is inserted into the die-cast housing from above. On the right and left, it is secured with hexagon nuts. When the shaft of the eddy-current brake presses against the base of the bearings, the tension of the toothed belt is correct. After insertion of the eddy-current brake its center run is adjusted by a slight tilt. The slots accepting the traction rope must be in a vertical position. The bearing is secured with a hexagon counter nut. A ring wrench is required for this purpose.

The **toothed belt** is an endless belt. It is installed together with the free-wheel shaft.

The **chain** is linked with a chain lock. Once the lock has been opened, the chain can be removed.

Replacement:
For servicing, the entire drive unit can be replaced.
* Drive unit with straing gauge and PCB RPM, assembled.

E-2. Troubleshooting and Repairs

The following components of the drive unit are available as spare parts for replacement.

- Service Kit: Strain gauge, elastic element, complete kit
- Service Kit: Return spring with micro rope, complete kit
- Service Kit: PCB RPM, complete kit

E-2.1. Replace Strain Gauge

Before replacing the strain gauge, check whether one of the micro ropes is disengaged (you have to remove the housing first) or whether the prestress spring is excessively strained.

The complete strain gauge must always be replaced.

- Disconnect cable connecting strain gauge to PCB RPM and remove strain gauge.
- Remove sealing varnish, then take off the micro ropes.
- Remove clamping plate.
- Replace strain gauge; reverse above steps to reassemble.
- Hang the micro ropes and screw the strain gauge tight.
- Connect strain gauge to PCB RPM.

Caution:
The safety ball of the micro rope must not touch the rubber layer of the strain gauge (**risk of destruction**).

Caution:
After replacing the strain gauge, repeat weight calibration (torque calibration) of ergometer.

E-2.2. Replace PCB RPM

Disconnect the following cables before replacing PCB RPM:
- cable to strain gauge
- cable to power supply and RS232 interface
- cable to eddy-current brake

Caution:
After replacing PCB RPM, repeat weight calibration (torque calibration) of ergometer.

E-2.3 RPM Board : Replacement and Adjustment Procedure

Replacement of PCBRPM Boards 1 and 2

Disconnect ergometer from mains supply.
Dismantle Ergometer as described in Service Manual.

Cut cable tie.

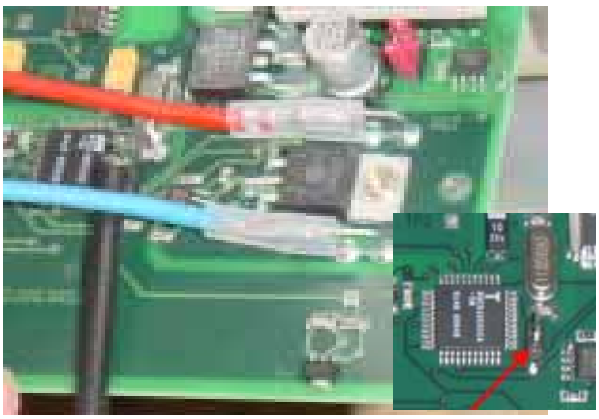
Disconnect cable to strain gauge (black wire at the bottom).

Remove fixation screws of RPM board

Disconnect both cables to eddy-current brake.

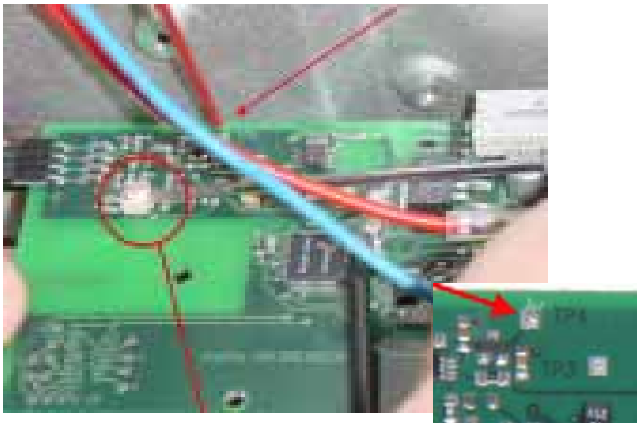
Disconnect connector to power supply and IFP interface - loosen connector on both sides carefully.

Adjustment of PCBRPM Board 1



Connect both cables to eddy-current brake.
Connect both cables to WSG.
Connect both connector to power supply / IFP board.

Connect ground of multimeter to outer test point (see red arrow).

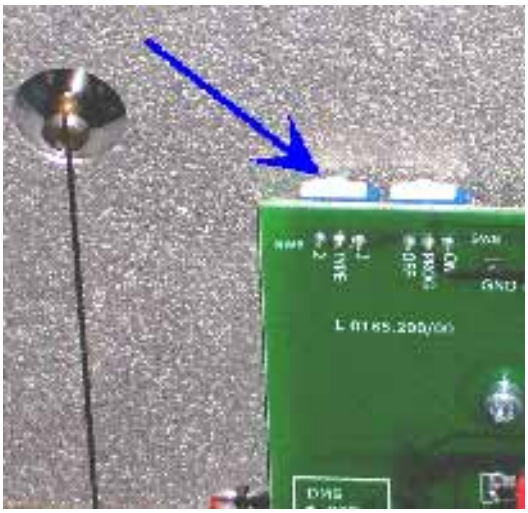


Caution: RPM board must not be connected to ground.
No strain on cable to eddy current brake.

Connect ergometer to mains.
Connect measurement lead of multimeter to test point tp4 (see arrow).
Adjust zero voltage with potentiometer (see circle) to a value between 60 and 80 mV:
turn counterclockwise to decrease offset voltage
turn clockwise to increase offset voltage

Discconect ergometer from mains.
Fix RPM board again.
Perform load calibration as described with 8 kg weight

Adjustment (mounting) of RPM Board (PCBRPM 2)



Note: PCBRPM 2 works only in conjunction with V1.6 and higher!

Connect both cables to eddy-current brake (see picture of Adjustment of PCBRPM board 1).

Connect cable to WSG.
Connect connector to power supply / IFP board.

Select the type of the drive unit with the miniature switch as shown at left.

Type 1 for drive unit 1 with two magnets.

Type 2 for drive unit 2 with three magnets.

Caution:
If the display indicates half the speed (rpm) and the double load or the double speed (rpm) and half the load after the weight calibration, then the wrong type of drive unit was selected!

Fix PCBRPM board 2 with the screws.

Connect ergometer to mains, switch on the ergometer and enter the service menu.

Follow the procedure described in section 2b.

Part F: Servicing Instructions

F-1. Spare Parts for Repair of eBike

Overview: Adjustments required after replacement of assemblies

Replaced Assembly	Required Adjustment
chassis	no replacement
drive unit with PCB RPM	no adjustment required
PCB RPM	requires calibration (8 kg)
steel wire on drive unit	requires calibration (8 kg)
PCB Interface (= PCBIF)	check DIP switches + menu settings (e.g. EKG type)
control terminal	check contrast of LCD display
PCB Display in control terminal	no adjustment required
power supply	no adjustment required
PCB BP in control terminal	no adjustment required
NIBP pump module in base assembly	no adjustment required
saddle tube	calibration of saddle height indication
saddle motor (eBike Comfort only)	calibration of saddle height indication
saddle height indication (eBike Basic / eBike Comfort only)	no adjustment required
clamping lever	grease clamping lever
software update	check settings and EKG type in particular
only eBike L / eBike EL:	
saddle motor	no adjustment required
lift motor for supine plane position	perform reset
lift motor for leftside slope position	perform reset
motor control	perform reset
remote control	no adjustment required

F-2. Spare Parts for Repair of eBike L / eBike EL

Overview: Adjustments required after replacement of assemblies

Replaced Assembly	Required Adjustment	Required Procedures
chassis	no replacement	
drive unit with PCB RPM	no adjustment required	removing casing
PCB RPM	requires calibration (8 kg)	remove casing
steel wire on drive unit	requires calibration (8 kg)	remove casing
PCB Interface (= PCBIF)	check DIP switch + check menu settings (e.g. EKG Type)	
control terminal	no adjustment required	check contrast
PCB Display in control terminal	no adjustment required	check contrast
power supply	no adjustment required	
PCB BP in control terminal	no adjustment required	
NIBP pump module in connection box	no adjustment required	
saddle motor	no adjustment required	
lift motors	reset motor control	
motor control	reset motor control	
remote control	no adjustment required	
clamping lever	grease clamping lever	
software update	check settings and EKG Type, in particular	

F-3. Add-on “BP Module eBike“

2017911-089 ERGOMETER EBIKE BP ADD-ON KIT
for use with

2017911-001 eBike basic with control terminal PC
2017911-002 eBike basic with control terminal PCplus
2017911-005 eBike comfort with control terminal PC
2017911-006 eBike comfort with control terminal PCplus

eBike PC

eBike PCplus

F-4. Add-on “BP Module eBike L“ & “BP Module eBike EL“

Two different BP add-on kits are available for the couch ergometers eBike L & eBike EL:

2017911-036 ERGOMETER EBIKE L&EL BP ADD-ON KIT
for use with

2017911-020 eBike L couch ergometer, input voltage 240 V
2017911-024 eBike L couch ergometer, input voltage 120 V
2017911-028 eBike EL couch ergometer, input voltage 240 V
2017911-032 eBike EL couch ergometer, input voltage 120 V

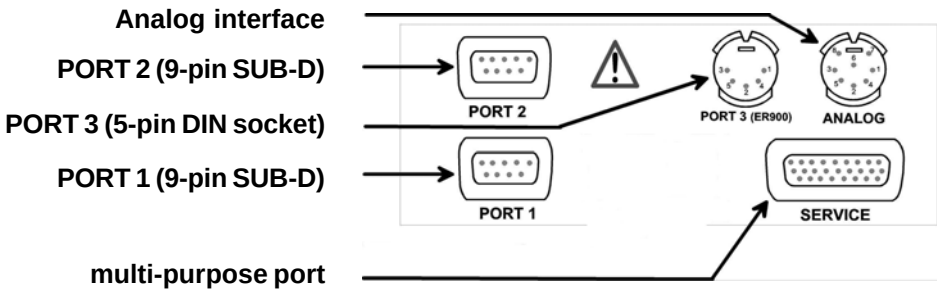
and

2017911-043 ERGOMETER EBIKE L&EL EXTERNAL TERMINAL BP ADD-ON KIT:
for use with

2017911-022 eBike L couch ergometer with external control terminal, input voltage 240 V
2017911-026 eBike L couch ergometer with external control terminal, input voltage 120 V
2017911-030 eBike EL couch ergometer with external control terminal, input voltage 240 V
2017911-034 eBike EL couch ergometer with external control terminal, input voltage 120 V

Appendix A: Interfaces

The modular ergometer system **eBike** has several interfaces. Digital as well as analog data can be exchanged with the ergometer. These interfaces thus allow the ergometer to be fully controlled from a PC or EKG unit and they also permit a mere transfer of data from the ergometer to the EKG unit and PC.



A.1 Digital Interfaces PORT 1 and PORT 3

A.1 a Setup for: Digital ECG Unit

PORT 1:
Digital interface RS 232 + remote start

- **Pin configuration (view of connector):**

Pin 1	-
Pin 2	Receive (Input)
Pin 3	Transmit (Output)
Pin 4	-
Pin 5	GND
Pin 6	-
Pin 7	-
Pin 8	remote start EKG unit
Pin 9	-

PORT 3:
Digital interface RS232

Pin 1	TxD
Pin 2	GND
PIN 3	-
Pin 4	-
Pin 5	RxD

- **Voltages:**

	logic low	logic high
Transmit *Output* (Pin 3 or Pin 1)	> +7 V	> -7 V
Receive *Input* (Pin 2 or Pin 5)	> +3 V	> - 3 V

- **Baudrate (adjustable via software menu):**
  default setting: **4800 Baud**
  available settings: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 Baud

- **Protocol**:

Format:	ASCII
Start bit:	1
Data bit:	8
Stop bit:	1
Parity:	None
Handshake:	None

Transmission Protocol RS232 (PORT 1 and PORT 3): Digital EKG Unit

command from PC (EKG unit)	feedback from eBike	Description
Wxxx <CR>	—	sets nominal load value to xxx Watt
S <CR>	—	initiates BP measurement at rest, then starts the exercise protocol with the initial load
s <CR>	—	initiates exercise protocol with the initial load, no BP measurement at rest
B <CR>	B xxx <CR>	requests current nominal load returns current load in W
D <CR>	n xxx <CR>	requests current RPM value returns current RPM value
O <CR>	O xxx <CR>	requests current systolic BP value returns current systolic BP value in mmHg
U <CR>	U xxx <CR>	requests current diastolic BP value returns current diastolic BP value in mmHg
F <CR>	- - -	terminates exercise protocol
I <CR>	erxxxP10Vyyy <CR>	identifies the ergometer The string contains the ergometer model „xxx“ and the software version. Note: For compatibility with er900, the transferred string reads „er900P10VV243“.

A.2 Digital Interface PORT 2: For SERVICE PURPOSES only

- **Pin configuration (view of connector):**

Pin 1	-
Pin 2	Transmit (Output)
Pin 3	Receive (Input)
Pin 4	-
Pin 5	GND
Pin 6	-
Pin 7	-
Pin 8	-
Pin 9	-

- **Voltages:**

	logic low	logic high
Transmit *Output* (Pin 2)	> +7 V	> -7 V
Receive *Input* (Pin 3)	> +3 V	> - 3 V

A.3 Analog Interfaces With Digital Data Transfer

For analog load control from EKG unit and automatic, digital data communication with EKG unit

- **ANALOG: Pin configuration (view of connector):**

ANALOG

Pin 1	External load (input)
Pin 2	-
Pin 3	Remote start EKG unit (output)
Pin 4	-
Pin 5	Load output
Pin 6	-
Pin 7	-
Pin 8	
Enclosure	GND

- **Voltages:**

Analog	minimum	maximum	resolution
set load (input)	0 V	+10 V DC	adjustable
set load (output)	0 V	+10 V DC	adjustable

- **PORT 1 or PORT 3: Pin configuration, digital (view of connector):**

PORT 1

PORT 3

Pin 1	-
Pin 2	Receive (Input)
Pin 3	Transmit (Output)
Pin 4	-
Pin 5	GND
Pin 6	-
Pin 7	-
Pin 8	remote start EKG unit
Pin 9	-

Pin 1	TxD
Pin 2	GND
PIN 3	-
Pin 4	-
Pin 5	RxD

- **Transmission Protocol:**
With the **Analog** setting, the system responds to a digital request by sending a standardized data record. The string consists of 54 alphanumeric characters as well as of **Carriage Return** and **Line Feed** as end-of-line characters. Via the RS232 interface, only the command **S** <CR> is accepted, all other characters are ignored. The exercise test cannot be terminated by sending a command to the interface. BP values will read “000” in the data string to indicate erroneous BP measurements.

The command **S <CR>** initiates a BP measurement. Upon termination of the BP measurement, the ergometer outputs the data record.

No.xx, SYST:xxx mmHg, DIAST: xxx mmHg, Pulse: xxx/min <CR> <LF>

where **No.xx**is used to identify the consecutive BP measurements (No.01**,** No.02**, ...).**

Appendix B: Spare Parts / Service Kits for eBike

Part No.	Short Description	Description
2017911-010	SPLY EBIKE CUFF ADULT STD TUBE 130CM	BP cuff, adults, 130 cm tubing
2017911-011	SPLY EBIKE CUFF ADULT STD TUBE 200CM	BP cuff, adults, 200 cm tubing
2017911-012	SPLY EBIKE CUFF ADULT LARGE TUBE 130CM	BP cuff, adults, long version, 130 cm tubing
2017911-013	SPLY EBIKE CUFF ADULT LARGE TUBE 200CM	BP cuff, adults, long version, 200 cm tubing
2017911-014	SPLY EBIKE CUFF INFANT TUBE 100CM	BP cuff, children, 100 cm tubing
		adjustable cranks, assembled
2017911-015	SPLY EBIKE SADDLE MOUNT INFANT	saddle mount for children's saddle, eBike basic/comfort

2017911-016	SPLY EBIKE SADDLE INFANT	children's saddle, black

2017911-017	SPLY EBIKE SADDLE SPORT	racing saddle, black

2018111-058	Flash Update Kit	

Part No.	Short Description	Description
2**017911-018**	**SPLY EBIKE SADDLE MOUNT HOR ADJUSTABLE**	saddle fixture, horizontally adjustable

2017911-019 SPLY EBIKE CRANK SET ADJUSTABLE

The scope of delivery consists of the following parts:
2 pc. combi screw M8 x 1 x 18, SW 14 mm
2 pc. ribbed disk
2 pc. terminal cap for pedal cranks
1 pc. Allan key, black, width 5 mm (for adjustment of crank length)

Housing / Basic Unit eBike:

2018111-002 SPARE EBIKE HANDLEBAR TUBE W CABLE

Service Kit: handlebar tube with spiral cable, comprising:
- handlebar tube, galvanized, yellow, for eBike basic/comfort
- spiral cable CAN, incl. connection for control terminal
- dual spiral cable, black and blue (ECG + NIBP)
- 3x tubing joints GS4
- incl. assembly material
  2x cable ties 3.5 / 180 mm (installed)
  2x cable ties 2.4 / 95 mm (supplied)

2018111-003 SPARE EBIKE CLAMPING LEVER/PLATE SET

Service Kit: Plate with threaded bushing and clamping lever, incl. grease, kit consisting of:
- clamping lever M10x 25, clamping saddle/handlebar
- plate with threaded bushing, front and rear, 54x35x 8 mm
- clamping sheet 40x37x5 drawn
- setscrew M5x16
- high-performance lubricant, white, approx. 5 g

2018111-004 SPARE EBIKE SETSCREW/PLATE SET

Service Kit: Plate with threaded bushing, with setscrew, incl. grease, kit consisting of:
- plate with threaded bushing, front and rear, 54x35x 8 mm
- clamping sheet 40x37x5 drawn
- setscrew M10x20
- nut M10
- setscrew M5x16
- high-performance lubricant, white, approx. 5 g

2018111-005 SPARE EBIKE BASE FOR SADDLE HEIGHT DSPLY

Service Kit: Base for saddle height display consisting of:
1x base for saddle height display
2x screw M3x12

Part No.	Short Description	Description

2018111-006 SPARE EBIKE WNDW FOR SADDLE HEIGHT DSPLY

Window for saddle height display

2018111-007 SPARE EBIKE PCB FOR SADDLE HEIGHT DSPLY

PCB display for saddle height indication

2018111-008 SPARE EBIKE CABLE FOR SADDLE HEIGHT DSPLY

Cable connecting interface to saddle height display

2018111-009 SPARE EBIKE/B SADDLE TUBE

Service Kit: Assembled saddle tube w/o. motor for eBike basic, consisting of:
1x saddle guide tube w/o. motor 55x55x2 for eBike basic
1x saddle tube w/o. motor 50x50x3 for eBike basic
4x screw M8 x 20
4x star washer 8.4x15x0.8
1x clamping lever M10x 25 for clamping of saddle/handlebar
1x plate with threaded bushing, front and rear, 54x35x 8 mm
1x clamping sheet 40x37x5 drawn
1x setscrew M5x16
1x spacer pin M3, length 12 mm
1x screw M3x8
2x washer 3, 2x7x0.5
1x hex nut M3
1x high-performance lubricant, white, approx. 5 g
1 x screw M6x20

2018111-010 SPARE EBIKE/B SENSOR SADDLE HEIGHT

Service Kit: Saddle height sensor eBike basic, complete set
- saddle height sensor for eBike basic
- 2x countersunk screw M4x12

2018111-011 SPARE EBIKE/C SADDLE TUBE

Service Kit: Saddle tube, complete with motor for eBike comfort, consisting of:
1x saddle guide tube with motor 55x55x2 for eBike comfort
1x saddle tube with motor 50x50x3 for eBike comfort
4x screw M8 x 20
4x star washer 8.4x15x0.8
1x high-performance lubricant, white, approx. 5 g

Part No.	Short Description	Description
2018111-012	SPARE EBIKE/C SADDLE MOTOR	**Service Kit: saddle motor eBike comfort, consisting of:** 1x saddle motor, pre-assembled 1x shoulder bolt M8x25 1x washer U 8.4x16x1.6 1x nut M8, self-locking 1x washer U10.5x20x2
2018111-013	SPARE EBIKE/C SADDLE GUIDE	**Service Kit: saddle guide eBike comfort, consisting of:** 1x plate with threaded bushing, rear 54x35x8 mm 1x clamping block POM 35x35x8mm 1x nut M10 2x screw M5x16, galvanized 1x setscrew M10x20 with hexagon socket and flat point
2018111-014	SPARE EBIKE/C SADDLE HOST	**Service Kit: saddle host eBike comfort, kit consisting of:** 1x saddle host with motor 55x55x75 1x straight pin, diam. 10x36 2x screw M6x16
2018111-015	SPARE EBIKE/B COVER TOP GREY	cover, top (grey) for eBike basic
2018111-016	SPARE EBIKE/C COVER TOP BLUE	cover, top (GE blue) for eBike comfort
2018111-017	SPARE EBIKE/B COVER SET R/L	**Service Kit: casing eBike basic (GE), kit consisting of:** 1x side panel eBike basic, left, with silk-screened GE logo 1x side panel eBike basic, right, with silk-screened GE logo 2x connection piece, diam. 10, length 100 mm 10x washer U4.3x9x0.8 4x screw M4x12 cyl. 2x screw M4x30 cyl. 4x screw M4x10, combi-slotted 2x screw M4x25 cyl. 1x threaded rod M4, length 325 mm, galvanized, blue 2x hex nut M4, self-locking Cleveloc 1x cap D: 22.6, white 1x adhesive label 80x35 2x plastic wheel diam. 80 mm with slot 2x spring washer w/o. cap diam. 12x28 mm, galvanized, white 2x cap for plastic wheels 2x lock washer diam. 9 mm 2 x adhesive label roll 80x35 silver 1x adhesive label roll ø25 silver

Part No. Short Description	Description
2018111-018 SPARE EBIKE/C COVER SET R/L 	**Service Kit: casing eBike comfort (GE), kit consisting of:** 1x side panel eBike comfort, left, with silk-screened GE logo 1x side panel eBike comfort, right, with silk-screened GE logo 2x connection piece, diam. 10, length 100 mm 10x washer U4.3x9x0.8 4x screw M4x12 cyl. 2x screw M4x30 cyl. 2x screw M4x25 cyl. 1x threaded rod M4, length 325 mm, galvanized, blue 2x hex nut M4, self-locking Cleveloc 1x cap D: 24.6, white 1x foot rest cover left 1x foot rest cover right 1x adhesive label 80x35 2x plastic wheel diam. 80 mm with slot 2x spring washer w/o. cap diam. 12x28 mm, galvanized, white 2x cap for plastic wheels 2x lock washer diam. 9 mm 2 x adhesive label roll 80x35 silver 1x adhesive label roll ø25 silver
2018111-019 SPARE EBIKE WHEEL SET 	**Service Kit: Plastic wheels, kit consisting of**: 2x plastic wheel diam. 80 mm with slot 2x spring washer w/o. cap diam. 12x28 mm, galvanized, white 2x cap for plastic wheels 2x lock washer diam. 9 mm
2018111-020 SPARE EBIKE STRAIN RELIEF SET 	**Service Kit: Strain relief, kit consisting of:** - 3x cable strain relief, size 1, black, 4.5 - 5.7 mm - 1x cable strain relief, size 3, black, 6.5 - 7.7 mm - 4x screw M5x18 Li Kr
2018111-021 SPARE EBIKE LEG LEVELLERS 	**Service Kit: Levelling device, kit consisting of:** 2x levelling device M10x30
Saddle ebike: 2018111-022 SPARE EBIKE SADDLE STANDARD 	Bicycle saddle, standard
2018111-024 SPARE EBIKE BELLOW SET 	**Service Kit: Bellows kit consisting of:** 1x bellows handlebar, grey, for eBike 1x bellows saddle, grey, for eBike

Part No.	Short Description	Description

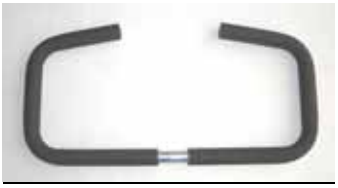
Handlebar eBike:

2018111-025 SPARE EBIKE ADAPTER TERMINAL

Service Kit: Control terminal adapter for eBike consisting of:
1x control terminal adapter, 2 parts
2x star washer Z 8.4x15x0.8
2x screw M8x35
1x clamping lever M8x30 for clamping of handlebar
2x screw M6x25 cyl., slot
2x screw M4x10

2018111-026 SPARE EBIKE HANDLEBAR 500MM

Handlebar with clamping opening, width 500 mm



Pedal eBike:

2018111-027 SPARE EBIKE CRANK/PEDAL SET R/L

Pedal set, left and right, cranks and pedals, comprising:
1x crank, left, square, 170 mm
1x crank, right, square, 170 mm
1x pedal, home trainer, left and right, with Velco strap
2x combi-slotted screw M8x1x18
2x lock washer
2x cap for crank thread

2018111-028 SPARE EBIKE PEDAL SET R/L

Pedal set, consisting of:
1x pedal, home trainer, left and right, with Velco strap

2018111-029 SPARE EBIKE SCREW SET FOR CRANKS

Service Kit: screw set for pedal kit consisting of:
2x combi-slotted screw M8x1x18
2x lock washer
2x cap for crank thread

Drive unit eBike:

2018111-138 SPARE EBIKE DRIVE UNIT NEW/2
(Note: software version 1.6 mandatory)

Service Kit: drive unit, new, for eBike, consisting of:
1x drive unit, assembled
6x screw M8x20
6x star washer 8.4x15x0.8

Part No.	Short Description	Description
2018111-139	SPARE EBIKE DRIVE UNIT EXCHANGE/2	**Service Kit: drive unit, replacement, for eBike, consisting of:** 1x drive unit, replacement, assembled 6x screw M8x20 6x star washer 8.4x15x0.8
2018111-032	SPARE EBIKE STRAIN GAUGE	**Service Kit: Strain gauge, kit consisting of:** 1x strain gauge, pre-assembled for drive unit eBike 1x clamping plate 2x star washer F3.2 2x screw M3x10 1x micro rope, short, diam. 0.81 mm 7x7, length 88.7 mm, for eBike
2018111-033	SPARE EBIKE RETURN SPRING	**Service Kit: return spring with micro rope, consisting of:** 1x return spring with micro rope, diam. 0.6 mm 1x19, length 125 mm 1x clamping plate 2x star washer F3.2 2x screw M3x8
2018111-140	SPARE EBIKE PCB RPM2	**Service Kit: PCB RPM, fully equipped for eBike** 1x PCB RPM 1x spacer pin M3, length 12 mm 2x star washer F3.2 2x screw M3x8 1x addendum for PCB RPM 2
Power supply eBike:		
2018111-141	SPARE EBIKE POWER SUPPLY/3	**Service Kit: power supply module for eBike, kit consisting of:** 1xpower supply 24V, 2.5A, 60VA, 50/60 Hz, preassembled on sheet panel 1x interface cable connecting to power supply 1x cable connecting the power supply to the power switch 4x screw M4x12 2x star washer, diam. 4.3 mm 1x hex nut M4 1x washer, diam. 4.3 x 12 x 1 2x microfuse 1.25A, slow-blow 1x sticker with fuse and power ratings (narrow) 1x sticker with fuse and power ratings (wide) 1x addendum for power supply
		Service Kit: earth cable, kit consisting of: 1x earth cable, 1.5 mm2, 100 mm 2x disk Z4.3x8x0.5 inside 1x hex nut M4 1x washer, diam. 4.3 x 12 x 1

Part No.	Short Description	Description

2018111-037 SPARE EBIKE MAINS CONNECTOR SET

Service Kit: mains connection, kit consisting of:

1x cold-appliance connector, KEA socket
1x cold-appliance connector, KEA drawer for 2 fuses
2x microfuse 5x20 2.0 A slow-blow
2x microfuse 5x20 1.25 A slow-blow
2x screw M3x14
1x hex nut M3
1x spacer pin 3050/28 M3, length 28 mm
1x fixture for power cord 39x32.5x2.5
3x star washer F3.2
1x knurled screw M3x8

2018111-038 SPARE EBIKE POWER SWITCH

Service Kit: power switch with paneling, kit comprising:
1x power switch, pre-assembled, for eBike
1x additional cable connecting the power supply to the power switch
This cable is only intended for power supply versions 1 and 2
(Figure c-12a and c-12b).
1x cable tie

2018111-039 SPARE EBIKE CABLE MAINS EURO

Power cord, grey, length 2.5 m, German connector

PCBs eBike:

2018111-040 SPARE EBIKE/C PCB INTERFACE

PCB Interface kit for eBike comfort with saddle motor:
1x interface module, pre-assembled
4x screw M4x8

2018111-137 SPARE EBIKE/B PCB INTERFACE

PCB Interface kit for eBike comfort without saddle motor:
1x interface module LC, pre-assembled
4x screw M4x8

2018111-041 SPARE EBIKE DIN CONNECTOR SET

Service Kit: DIN sockets on PCB Interface, comprising:
1x cable from interface to analog socket (8-pin DIN socket)
1x cable from interface to RS232 (5-pin DIN socket)

Part No.	Short Description	Description

Blood Pressure eBike:

2018111-042 SPARE EBIKE BP PUMP MODULE

Service Kit: Blood-pressure module (pump unit) consisting of:
1x blood-pressure module, pre-assembled, complete with
4x screw M4x8

Control Terminal eBike PC

2018111-043	SPARE EBIKE TERMINAL PC NEW	control terminal, new, control terminal PC, standard (= w/o. BP), GE 2x screw M4x10, combi-slotted
2018111-044	SPARE EBIKE TERMINAL PC W BP NEW	control terminal, new, control terminal PC, with BP module, GE 2x screw M4x10, combi-slotted
2018111-047	SPARE EBIKE TERMINAL PC EXCHANGE	control terminal, replacement, control terminal PC, standard (= w/o. BP), GE 2x screw M4x10, combi-slotted
2018111-048	SPARE EBIKE TERMINAL PC W BP EXCHANGE	control terminal, replacement, control terminal PC, with BP module, GE 2x screw M4x10, combi-slotted

Control Terminal eBike PCplus

2018111-045	SPARE EBIKE TERMINAL PCplus NEW	control terminal, new, control terminal PCplus, standard (= w/o. BP), GE 2x screw M4x10, combi-slotted
2018111-046	SPARE EBIKE TERMINAL PCplus with BP NEW	control terminal, new, control terminal PCplus, with BP module, GE 2x screw M4x10, combi-slotted
2018111-049	SPARE EBIKE TERMINAL PCplus EXCHANGE	control terminal, replacement, control terminal PCplus, standard (= w/o. BP), GE 2x screw M4x10, combi-slotted
2018111-050	SPARE EBIKE TERMINAL PCplus with BP EXCHANGE	control terminal, replacement, control terminal PCplus, with BP module, GE 2x screw M4x10, combi-slotted

Part No.	Short Description	Description

2018111-051 SPARE EBIKE TERMINAL PC W BP EXCHANGE

Service Kit: control terminal housing (control terminal PC), top shell consisting of:
1x control terminal housing, top shell for control terminal PC
1x membrane keypad PC with small display (GE version)
4x screw M3x12

2018111-052 SPARE EBIKE TERMINAL PC HOUSING TOP

Service Kit: control terminal housing (PCplus), top shell consisting of:
1x control terminal housing, top shell for control terminal PCplus
1x membrane keypad PCplus with large display (GE version)
4x screw M3x12

2018111-053 SPARE EBIKE TERMINAL P/K HOUSING BOTTOM

Service Kit: control terminal housing, bottom shell consisting of:
1x control terminal housing, bottom shell for control terminal eBike
1x display window control terminal top (RPM window)
4x screw M3x12

2018111-054 SPARE EBIKE TERMINAL PANEL W/O BP

connector panel, bottom, for control terminal w/o. cutout (w/o. BP)

2018111-055 SPARE EBIKE TERMINAL PANEL W BP

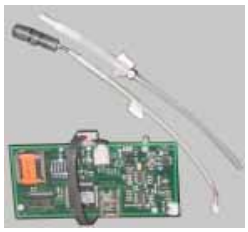
1x connector panel for terminal with BP (2018111-055)
1x connector panel, bottom, BP
1x jack bushing 2.5 mm for control terminal eBike
1x cable connecting microphone socket to PCB BP, pre-assembled
1x tube coupling control terminal eBike

Part No.	Short Description	Description
Service Kits ebike, miscellaneous:		
2018111-056	**SPARE EBIKE SCREW SET**	**Service Kit: screw set, kit consisting of:** 4x screw M3x8 cyl. 2x screw M3x8, Philips 2x screw M3x12 2x screw M3x14 4x screw D 3.5x9.5 4x screw M4x8 6x screw M4x10, combi-slotted 16x screw M4x12 cyl. 4x screw M4x25 cyl. 4x screw M4x30 cyl. 2x screw M5x16 4x screw M5x18, Philips 2x screw M6x16 2x screw M6x25 6x screw M8x20 cyl. 2x screw M8x35 cyl. 1x shoulder bolt 10, M8x25 1x knurled screw M3x8 5x washer F 3.2x6x0.4 12x washer U 4.3x9x0.8 10x washer Z 4.3x8x0.5 14x washer Z 8.4x15x0.8 1x washer U 8.4x16x1.6 1x washer U 10.5x20x2 1x hex nut M3 1x hex nut M4 2x hex nut M4, self-locking 1x nut M8, self-locking 4x nut M10 2x setscrew M5x16 1x setscrew M10x20 1x straight pin D 10m6x36 1x spacer pin M3 12 mm 1x spacer pin M3 28 mm 4x stand-off 12.7 mm 1x fixture for power cord 1x cable bushing black 1x threaded rod M4 325 mm
2018111-057	**SPARE EBIKE TUBE SET**	**Service Kit: tube set for control terminal and BP consisting of:** 0.5 m silicon tubing D 1.0 x 1.0 0.5 m silicon tubing D 2 x 1.5 0.5 m silicon tubing D1.5 x 1.0 1.0 m silicon tubing D 3 x 2 2.0 m silicon tubing D 4x2 5x tubing joint WS3 3x connecting piece (TS 4) 5x plug connection YS 4, D 4 mm 3x tubing joint, straight, D 4.0 x 1.5 5x tubing clip 12 H 4122 5x fastening socket, self-adhesive, for cable ties up to 3 mm 10x cable tie 2.4, length 95 mm
Documentation		
2018112-001	MNL OPR EBIKE PC	Operator's Manual System eBike, PC
2018112-002	MNL OPR EBIKE PCPLUS	Operator's Manual System eBike, PCPlus terminal
2018112-003	MNL SVCE EBIKE	Servicing Instructions System eBike, English
Service tools		
2018111-135		8 kg cailbration weight, incl. hook
22336203		Cable PC- Ergometer 22336203
2005737-001		Paddle puller 2005737-001

Appendix B.2: Spare Parts / Service Kits for eBike L / eBike EL

Part No.	Short Description	Description

2017911-036 ERGOMETER EBIKE L&EL BP ADD-ON KIT



Service Kit: Retrofit Kit Blood Pressure Module Basic for eBike L / EL
comprising:
1x PCB BP for control terminal incl.
1 x cable connecting to PCB BP with
1 x fastening socket, self-adhesive
1 x cable tie, 95 mm

1 x silicone tubing to pressure sensor, 110 mm
1x silicone tubing, 60 mm
1 x fastening socket, self-adhesive
1 x cable tie, 95 mm
1x tubing joint, straight, 4.0 mm / 1.5 mm
1x tubing joint, KU straight, GS 4

4x washer U3.2, plastic (spare for terminal)
4x screw M3.8 (spare for terminal)
4x screw M3x12 (spare for terminal)
2x screw M4x 10 for terminal (spares)

1x BP module (pump unit), preassembled
4x spacer pin M4x 5
4x washer 4.3x12x1
4x nut M4
1 x cable tie, 95 mm

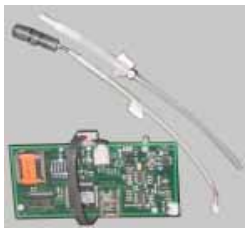
2x cuff connection angle 50x30x3, preassembled with
2x tube coupling for connector panel
2x silicone tubing, 550 mm

1x cable microphone basic, part 2, with all accessories
2x cable tie, 3.5 mm, width 180 mm
1x silicone tubing, 670 mm

4x washer Z4.3x8x0.5
4x screw M4 x 10
4x adhesive clamp for tubing, aluminum
1 x cable tie, 95 mm
1x connecting piece KU TS4 (spare)

1x BP cuff shackle, standard, 130 cm tubing
1x Addendum for BP Module retrofit kit

2017911-043 ERGOMETER EBIKE L&EL EXT TRMNL BP ADD-ON KIT



Service Kit: Retrofit Kit Blood Pressure Module External for eBike L / EL
comprising:
1x PCB BP for control terminal incl.
1 x cable connecting to PCB BP with
1 x fastening socket, self-adhesive
1 x cable tie, 95 mm

1 x silicone tubing to pressure sensor, 110 mm
1x silicone tubing, 60 mm
1 x fastening socket, self-adhesive
1 x cable tie, 95 mm
1x tubing joint, straight, 4.0 mm / 1.5 mm
1x tubing joint, KU straight, GS 4

4x washer U3.2, plastic (spare for terminal)
4x screw M3.8 (spare for terminal)
4x screw M3x12 (spare for terminal)
2x screw M4x 10 for terminal (spares)

1x BP module (pump unit), preassembled
4x spacer pin M4x 5
4x washer 4.3x12x1
4x nut M4
1 x cable tie, 95 mm

2x cuff connection angle 50x30x3, preassembled with
2x tube coupling for connector panel
1x silicone tubing, 550 mm

4x washer Z4.3x8x0.5
4x screw M4 x 10
4x adhesive clamp for tubing, aluminum
1 x cable tie, 95 mm
1x connecting piece KU TS4 (spare)

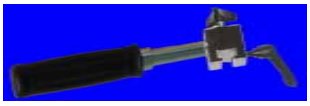
1x BP cuff shackle, standard, 130 cm tubing
1x Addendum for BP Module retrofit kit

Part No.	Short Description	Description
2017911-010	SPLY EBIKE CUFF ADULT STD TUBE 130CM	BP cuff, adults, 130 cm tubing

2017911-011	SPLY EBIKE CUFF ADULT STD TUBE 200CM	BP cuff, adults, 200 cm tubing
2017911-012	SPLY EBIKE CUFF ADULT LARGE TUBE 130CM	BP cuff, adults, long version, 130 cm tubing
2017911-013	SPLY EBIKE CUFF ADULT LARGE TUBE 200CM	BP cuff, adults, long version, 200 cm tubing
2017911-014	SPLY EBIKE CUFF INFANT TUBE 100CM	BP cuff, children, 100 cm tubing
2017911-037	SPLY EBIKE L&EL ARM REST W HOLDER	Arm rest with holder, ebike L/EL 1x upholstery arm rest L/EL, grey 1x holder OR rail L/EL 1x Novo Grip clamping lever M8x25 1x star knob M8x20

2017911-038	SPLY EBIKE L&EL ARM REST SWVL W HOLDER	Swiveling arm rest with holder, ebike L/EL 1x arm rest support L/EL 1x holder for arm rest, chromeplated 1x Novo Grip clamping lever M10x20 1x holder OR rail L/EL 2x Novo Grip clamping lever M8x25

2017911-039	SPLY EBIKE L&EL HANDGRIP W HOLDER	Handgrip with holder, ebike L/EL 1x handgrip with PVC holder, black 1x holder OR rail L/EL 1x Novo Grip clamping lever M8x25 1x star knob M8x20



2017911-040	SPLY EBIKE L&EL LEG REST SET R/ L	Leg rest set, right and left, for ebike L/EL 1x leg rest left, incl. all accessories 1x leg rest right, incl. all accessories 1x retaining clamp for leg rests with 2 screws M4x12 2x spacer sheets 4x threaded disk 30x6 4x washer U8.4 4x screw M8x50 (required for eBike L only) 4x screw M8x70 (required for eBike EL only)

2017911-041	SPLY EBIKE L&EL PEDAL SHOE SET R/L	Pedal shoe, left + right, complete with 2x combi-slotted screw M8x1x18 2x lock washer 2x end cap

2017911-042	SPLY EBIKE L&EL INFUSION HOLDER	Infusion holder 100 cm, incl. fastening device 1x holder OR rail eBike L/EL 1x Novo Grip clamping lever M8x25 1x star knob M8x 20

Part No.	Short Description	Description

Saddle eBike L / eBike EL

2018111-064 SPARE EBIKE L&EL SADDLE STANDARD

Service Kit: Saddle for eBike L/EL comprising:
1x saddle for eBike L/EL
1x socket pin
1x locking washer

2018111-065 SPARE EBIKE L&EL BELLOWS FOR SADDLE

1x bellows saddle, grey, for eBike

2018111-066 SPARE EBIKE L&EL HOLDER FOR BELLOW SDLE

Service Kit: Holder for bellows, saddle comprising:
1x retaining piece bellows saddle
4x washer U 4.3
4x screw 3.5 x 16

2018111-067 SPARE EBIKE L&EL SADDLE MOTOR

Service Kit: Saddle motor eBike L / EL, complete, comprising:
1x saddle motor eBike L / EL
1x stud screw SW19
2x washer U13
1x nut M12, self-locking
1x clamp
2x screw
1x foam rubber
1 x cable tie, 280 mm

Pedal eBike L / eBike EL

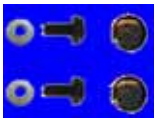
2018111-027 SPARE EBIKE CRANK/PEDAL SET R/L

Service Kit: Pedal set, left and right, cranks and pedals, comprising:
1x crank, left, square, 170 mm
1x crank, right, square, 170 mm
1x pedal, home trainer, left and right, with Velco strap
2x combi-slotted screw M8x1x18
2x lock washer
2x end cap for crank

2018111-028 SPARE EBIKE PEDAL SET R/L

Service Kit: Pedal set, comprising:
1x pedal, hometrainer, left, with Velcro strap
1x pedal, home trainer, right, with Velco strap

2018111-029 SPARE EBIKE SCREW SET FOR CRANKS



Service Kit: screw set for pedal kit comprising:
2x combi-slotted screw M8x1x18
2x lock washer
2x cap for crank thread

2018111-068 SPARE EBIKE L VELCRO FOR PEDAL SHOE R/L

Service Kit: Velcro strap for pedal shoe comprising:
2x Velcro strap 450 mm, for pedal shoe
2x grub screw
8x setscrew M3x5

Part No.	Short Description	Description

Drive Unit eBike L / eBike EL

2018111-138 SPARE EBIKE DRIVE UNIT NEW/2

Service Kit: drive unit, new, for eBike, comprising:
1x drive unit, assembled
6x screw M8x20
6x star washer 8.4x15x0.8

2018111-139 SPARE EBIKE DRIVE UNIT EXCHANGE/2

Service Kit: drive unit, replacement, for eBike, comprising
1x drive unit, replacement, assembled
6x screw M8x20
6x star washer 8.4x15x0.8

2018111-032 SPARE EBIKE STRAIN GAUGE

Service Kit: Strain gauge, kit comprising:
1x strain gauge, pre-assembled for drive unit eBike
1x clamping plate
2x star washer F3.2
2x screw M3x10
1x micro rope, short, diam. 0.81 mm 7x7, length 88.7 mm, for eBike

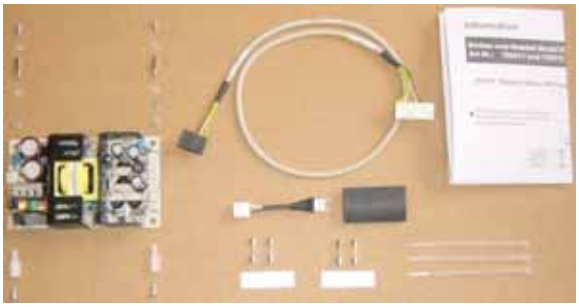
2018111-033 SPARE EBIKE RETURN SPRING

Service Kit: return spring with CGA micro rope, comprising
1x return spring with CGA micro rope, diam. 0.6 mm 1x19, length 125 mm
1x clamping plate
2x star washer F3.2
2x screw M3x8

2018111-140 SPARE EBIKE PCB PCB RPM2

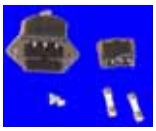
Service Kit: PCB RPM, fully equipped for eBike
1x PCB RPM
1x spacer pin M3, length 12 mm
2x star washer F3.2
2x screw M3x8
1x addendum for PCB RPM 2

Power Supply eBike L / eBike EL - 2018111-142 SPARE EBIKE L&EL POWER SUPPLY/3



Service Kit: power supply module for eBike L / EL (new model is backward compatible with all versions of eBike L and EL), kit comprising:
1x power supply 24V, 2.5A, 60VA, 50/60 Hz
1x interface cable connecting to power supply
2x stand-off 12.7 mm
2x screw 3.5 x 9.5
3x cable tie
2x spacer pin M3, length 12mm
6x star washer F3.2
2x screw M3x8
1x shrink-down tubing Ø18mm 50mm
1x adapter cable
2x micro fuse 3.0 A, slow-blow (for 120 V)
2x micro fuse 2.0 A, slow-blow (for 240 V)
1x sticker with fuse and power ratings (120 V)
1x sticker with fuse and power ratings (240 V)
1x addendum

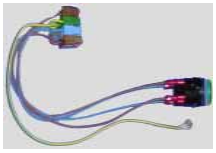
2018111-070 SPARE EBIKE L&EL MAINS CONNECTOR SET 240



Service Kit: Mains connection kit 230 V, comprising:
1x cold-appliance connector, KEA socket
1x cold-appliance connector, KEA drawer for 2 fuses
2x micro fuse 3.0 A, slow-blow
2x micro fuse 2.0 A, slow-blow
2x screw M3x6

2018111-071 SPARE EBIKE L&EL MAINS CONNECTOR SET 120

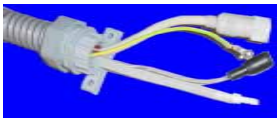
Service Kit: Mains connection kit 120 V, comprising:
1x cold-appliance connector, KEA socket
1x cold-appliance connector, KEA drawer for 2 fuses
2x micro fuse 3.5 A, slow-blow
2x micro fuse 3.0 A, slow-blow
2x screw M3x6

Part No. Short Description	Description
2018111-072 SPARE EBIKE L&EL INTERNAL PWR CABLE SET	**cable set, internal, for power supply eBike L / EL, comprising:** 1 x cable power supply to modular plug connector 1x cable cold appliance plug to modular plug 1x cable tie 95 mm 1x control cable connecting to modular connector (eBike L) 1x control cable connecting to modular connector (eBike EL) 1x cable power supply to modular plug connector for Version 3 1x adapter cable
2018111-073 SPARE EBIKEL EL POWER SWITCH 	**Service Kit: power switch, complete, for eBike L/EL, comprising:** 1x switch ON/OFF, round, illuminated 1x cable power switch to modular plug 6x screw M3x12 4x cable tie, 95 mm
2018111-074 SPARE EBIKE L&EL EARTH CABLE SET	**Service Kit: Earth cable, kit for eBike L/EL comprising**: 1x earth cable from base to swivel section (eBike L and EL) 1x earth cable from base joint head to swivel section (eBike EL only) 8x washer Z4.3 4x washer U4.3 4x screw M4x 8 1x protective earth cable connecting to Basic control terminal
2018111-075 SPARE EBIKE CABLE MAINS EURO 5M	Power cord, grey, length 5 m, German connector
PC Boards eBike L / eBike EL	
2018111-076 SPARE EBIKE L&EL PCB IFP	**Service Kit: Interface Board (IFP PCP) eBike L / EL comprising:** 1x IFP Board eBike L / EL 5x screw M3x6 5x washer U3.2 6x locks SUB-D 6x screw M3x12 6x spring washer 1x blind plug
2018111-077 SPARE EBIKE L&EL INTERNAL PCB CABLE SET	cable set, internal, for PCB power supply and IFP, comprising: 1 x cable interface board to power supply 1 x cable interface board to terminal
Blood Pressure eBike L / eBike EL	
2018111-078 SPARE EBIKE L&EL BP PUMP MODULE	**Service Kit: 1x Blood-pressure module (pump unit) comprising:** 1x BP module (pump unit), preassembled 4x spacer pin M4x 5/8 4x washer 4.3x12x1 4x nut M4 1 x cable tie, 95 mm
Control Terminal eBike L / eBike EL	
2018111-045 SPARE EBIKE TERMINAL PP NEW	**Service Kit: Control terminal, new, PCplus terminal, without blood pressure, comprising:** 1x control terminal, new, PCplus terminal, without blood pressure 2x screw M4x10, combi-slotted

Part No. Short Description	Description
2018111-079 SPARE EBIKE L&EL TERMINAL PP W BP NEW underside „terminal with blood pressure“	**Service Kit: Control erminal, new, PCplus terminal L/EL, with blood pressure, comprising:** 1 x control terminal, new, PCplus terminal L/EL, with blood pressure 2x screw M4x10, combi-slotted
2018111-049 SPARE EBIKE TERMINAL PP EXCHANGE	**Service Kit: Control terminal, replacement, PCplus terminal, without blood pressure, comprising:** 2x screw M4x10, combi-slotted
2018111-080 SPARE EBIKE L&EL TRMINL PP W BP EXCHNGE	**Service Kit: Control terminal, replacement, PCplus terminal L/EL, with blood pressure, comprising:** 2x screw M4x10, combi-slotted
2018111-052 SPARE EBIKE TERMINAL PP HOUSING TOP 	**Service Kit: Control terminal housing (PCplus terminal), upper shell, comprising:** 1x control terminal housing, upper shell, for PCplus terminal 1x membrane keypad PCplus with large display 4x screw M3x12
2018111-053 SPARE EBIKE TERMINAL P/PP HOUSING BOTTM 	**Service Kit: control terminal housing, bottom shell comprising:** 1x control terminal housing, bottom shell for eBike terminal 1x display window control terminal top (RPM window) 4x screw M3x12
2018111-054 SPARE EBIKE TERMINAL PANEL W/O BP 	connector panel, bottom, for control terminal w/o. cutout (w/o. BP)
2018111-081 SPARE EBIKE L&EL BELLOW FOR TERMINAL in the illustration „bellows terminal“ is already mounted	**Service Kit: Control terminal bellows, comprising:** 1x Bellows, control terminal 2x retaining piece bellows control terminal 2x washer U4.3 2x screw 3.5x16
2018111-082 SPARE EBIKE L&EL HOLDER FOR TERMINAL illustration shows „retaining piece“ + „terminal bracket“ installed	**Service Kit: Terminal bracket comprising:** 2x retaining piece control terminal eBike L/EL 4x washer Z4.3 4x washer U4.3 4x screw M4x12 4x nut M4 1x retaining piece control terminal eBike L/EL 2x spacer control terminal POM 1x screw M6x60 2x washer U6.4 1x nut M6, self-locking 3x washer Z4.3 1x washer U4.3 1x screw M4x12
2018111-085 SPARE EBIKE L&EL STAND PANEL EXT TRMINL illustration shows terminal and flex tubing mounted on foot	**Service Kit: Foot for external control terminal, comprising:** 1x foot, external, eBike L/EL 4x leg, grey 2x screw M4x10

Part No.	Short Description	Description

2018111-086 SPARE EBIKE L&EL TUBE EXT TRMNL



in illustration
„Flex tubing on terminal side, loose“

in illustration „Flex tubing mounted to frame“

Service Kit: Flex tubing for external terminal L/EL, comprising:
1x Flexa Airflex 21x27, 2.5 m preassembled, with
2x screw connections for tubing
2x plastic fixation angles
4x screw M5x16
1x silicon tubing, 3.0 meters, diam. 3x2
1x tubing joint, GS4
1x microphone cable connecting to external control terminal
1x protective earth cable connecting to foot

2018111-087 SPARE EBIKE L&EL REVOLUTION DISPLAY

illustration at right
shows goose neck
installed

Service Kit: External
speed indicator for eBike L/EL comprising:
1x external spped indicator, complete with
goose neck and IFP connection cable
1x mounting material

Casing / Basic Unit eBike L / eBike EL

2018111-088 SPARE EBIKE L&EL COVER WITH HANDHOLD

Service Kit: Casing eBike L / EL, comprising:
1x casing eBike L / EL
6x screw M3x12
2x cable tie, 180 mm

2018111-089 SPARE EBIKE L&EL CLAMP BAR SET FOR COVER

Service Kit: Clamping bars for casing eBike L/EL comprising:
2x clamping bar for casing eBike L/EL
6x screw M3x12

2018111-090 SPARE EBIKE L&EL CONNECTION BOX

Service Kit: Connection box for eBike L/EL comprising:
1x connection box for eBike L/EL
6x screw M3x 12
3x star washer 4.3
1x washer 4.3
2x nut M4

2018111-091 SPARE EBIKE L&EL GUIDE BAR SET

Service Kit: Guide rail, comprising
1x guide rail
4x stand-off, diam. 14, length 12
4x screw M6x30

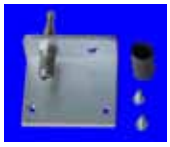
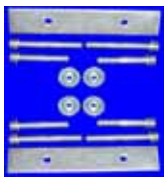
2018111-092 SPARE EBIKE L MOTOR CONTROLLER 240V

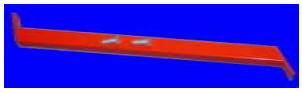
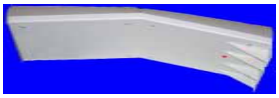
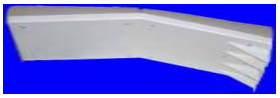
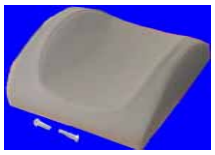
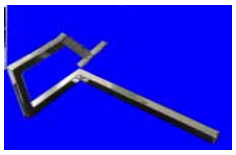
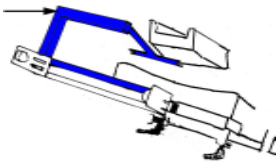
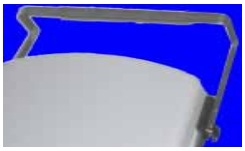
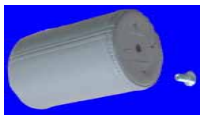
Service Kit: Motor controller magnetic 230 V for eBike L, dual-channel, comprising:
1x motor controller magnetic 230V/50Hz, dual-channel
4x washer 4.3
4x nut M4

2018111-093 SPARE EBIKE L MOTOR CONTROLLER 120V

Service Kit: Motor controller magnetic 120 V for eBike L, dual-channel, comprising:
1x motor controller magnetic 120V/60Hz, dual-channel
4x washer 4.3
4x nut M4

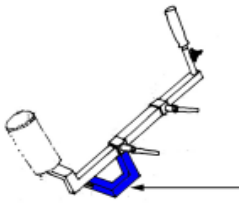
Part No.	Short Description	Description
2018111-094	SPARE EBIKE EL MOTOR CONTROLLER 240V	**Service Kit: Motor controller magnetic 230 V for eBike EL, three-channel, comprising:** 1x motor controller magnetic 230V/50Hz, three-channel 4x washer 4.3 4x screw M4x16
2018111-095	SPARE EBIKE L&EL MOTOR CONTROLLER 120V	**Service Kit: Motor controller magnetic 120 V for eBike EL, three-channel, comprising:** 1x motor controller magnetic 120V/60Hz, three-channel 4x washer U4.3 4x screw M4x16
2018111-096	SPARE EBIKE L REMOTE CONTROL	Hand switch for eBike L, dual-channel
2018111-097	SPARE EBIKE EL REMOTE CONTROL	Hand switch for eBike EL, three-channel with memory
2018111-098	SPARE EBIKE L MOTOR PITCH ANGLE	**Service Kit: Motor longitudinal tilt for eBike L, comprising:** 1x motor, longitudinal tilt (motor max. 30°) for eBike L 1x grommet black 2x stud screw SW19 4x washer U13 4x ring Hostaform D. 30 2x nut M12, self-locking
2018111-099	SPARE EBIKE EL MOTOR PITCH ANGLE	**Service Kit: Motor longitudinal tilt for eBike EL, comprising:** 1x motor, longitudinal tilt (motor max. 10°) for eBike EL 2x stud screw SW19 2x washer U24 2x washer U13 4x ring Hostaform D. 30 2x nut M12, self-locking 3x cable tie 95 mm
2018111-100	SPARE EBIKE EL MOTOR TRANSVERSE ANGLE	**Service Kit: Motor l laterral tilt for eBike EL, comprising:** 1x motor, lateral tilt (motor max. 10°) for eBike EL 2x stud screw SW19 2x washer U24 2x washer U13 4x ring Hostaform D. 30 2x nut M12, self-locking 3x cable tie 95 mm
2018111-101	SPARE EBIKE L HOLDER FOR PAPER ROLL 60	**Service Kit: Paper roll holder 60 cm for eBike L, comprising:** 1x paper dispenser for eBike L 2x washer U4.3 2x screw M4x12 1x tissue roll, white
2018111-102	SPARE EBIKE EL HOLDER FOR PAPER ROLL 50	**Service Kit: Paper roll holder 50 cm for eBike EL, comprising:** 1x paper dispenser for eBike EL 2x washer U4.3 2x screw M4x12 1x tissue roll, white

Part No. Short Description	Description
2018111-103 SPARE EBIKE L&EL CLAMPING LEVER SET	**Service Kit: Clamping lever kit for eBike L/EL comprising:** 1x clamping plate 30x8x34 1x reinforcing angle 34.3x25x2 1x Novo Grip clamping lever M10x15
2018111-104 SPARE EBIKE L&EL CLMPG LVR SET HANDGRIP	**Service Kit: Clamping lever kit for handgrip tube comprising:** 1x clamping sleeve for handgrip tube, complete 2x star washer 5.3 1x screw M5x6 1x Novo Grip clamping lever M10x15
2018111-105 SPARE EBIKE L&EL FIX TUBE W STAR HANDLE	**Service Kit: Fixation tube with star knob eBike EL, comprising:** 1x fixation tube for handgrip, complete 1x star knob M8x 20
2018111-106 SPARE EBIKE L&EL STAR HANDLE	**Service Kit: Star knob eBike L / EL, comprising:** 1x star knob M8x20
2018111-107 SPARE EBIKE L&EL CONNECTOR RACK FOR CUFF 	**Service Kit: Connection angle for cuff, comprising:** 1x connection angle cuff 50x30x3 1x tube coupling for connector panel 2x washer Z4.3 2x screw M4x10
2018111-108 SPARE EBIKE L&EL INTRNL MICROPHONE CABLE	Service Kit: Microphone cable, internal, incl. connections 1x microphone cable, Basic, part 1 1x microphone cable, Basic, part 2 2x screw M4x10 2x cable tie, length 180 mm 12x screw M3x12
2018111-109 SPARE EBIKE L&EL INTERNAL TUBE SET	Service Kit: tubing kit, complete, all types of tubing
2018111-110 SPARE EBIKE L&EL HOLDER FOR LEG REST 	**Leg rest bracket comprising:** 2x spacer sheets 4x threaded disk 30x6 4x washer U8.4 4x screw M8x50 (eBike L only) 4x screw M8x70 (eBike EL only)
2018111-111 SPARE EBIKE L FOOTBOARD SMALL RIGHT	**Service Kit: Foot board, small, for eBike L/EL comprising:** 1x foot board small 370x180x20 4x screw 5x17 (with eBike L: 1 each is used on the right and left) (with eBike EL: 1 is used on the left) 4x washer U6.4
2018111-112 SPARE EBIKE EL FOOTBOARD LARGE RIGHT	**Service Kit: Foot board, large, for eBike EL, comprising:** 1x foot board large 440x300x20 4x washer U6.4 4x screw M6x12

Part No. Short Description	Description
2018111-113 SPARE EBIKE L&EL CASTOR SET 	**Service Kit: Castor, locking, comprising:** 4x castors, locking, diam. 50 1x Allan key, size 8 5/16
2018111-114 SPARE EBIKE EL OUTRIGGER SUPPORT 	**Service Kit: Outrigger left, complete for eBike EL, comprising:** 1x outrigger eBike EL, fully assembled 2x washer U10 2x screw M10x40
2018111-115 SPARE EBIKE EL TRANSPORTATION LOCK 	**Service Kit: Transportation lock for eBike EL, comprising:** 1x transportation lock eBike EL with sticker „TOP“ 2x screw M10x30
Upholstery eBike L / eBike EL **2018111-116 SPARE EBIKE EL LEG REST RIGHT** 	**Service Kit: Leg rest, right, for eBike L / EL, comprising:** 1x leg rest, right, complete with upholstery, grey, mounted
2018111-117 SPARE EBIKE EL LEG REST LEFT 	**Service Kit: Leg rest, left, for eBike L/EL, comprising:** 1x leg rest, left, complete with upholstery, grey, mounted
2018111-118 SPARE EBIKE L&EL HEAD CUSHION 	**Service Kit: Head cushion eBike L/EL, comprising:** 1x head cushion eBike L/EL, grey 2x screw M6x30
2018111-119 SPARE EBIKE EL HOLDER FOR HEAD SUPPORT  	**Service Kit: Holder for head rest, chromeplated, comprising:** 1x support tubing head cushion (see arrow in sketch, right) 1x Novogrip clamping lever M10 x 15 1x reinforcing angle 34 x 25 x 2 1x clamping board 30 x 8, length 34 mm 2x screw M4 x 12 (for paper roll holder) 2x washer U 4.3 x 12x 1 (for paper roll holder) 1x high-performance lubricant, white, approx. 5 g
2018111-120 SPARE EBIKE L BRACKET FOR HEAD CUSHION 	**Service Kit: Bracket for head cushion (eBike L only) comprising:** 1x bracket for head cushion eBike L 2x clamp with star knob M8x20 (already mounted, see illustration at right)
2018111-122 SPARE EBIKE EL ARMPIT CUSHION 	Service Kit: Armpit cushion, grey (eBike EL only) 1x armpit cushion, grey (eBike EL only) 1x screw M8x25

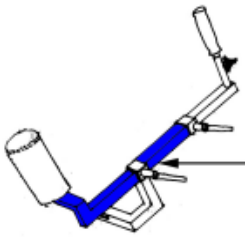
Part No.	Short Description	Description

2018111-123 SPARE EBIKE EL GUIDE TUBE ARMPIT SUPPORT



Service Kit: Guide tube armpit support (eBike EL only) comprising:
1x guide tube armpit support (see arrow in sketch, right)
2x Novogrip clamping lever M10x15
2x reinforcing angles 34x25x2
2x clamping board 30 x 8, length 34 mm
1x retaining screw M8x20
1x high-performance lubricant, white, approx. 5 g

2018111-124 SPARE EBIKE EL FIX



Service Kit: Support tubing armpit (eBike EL only)
1x support tubing for armpit (see arrow in sketch, right)
1x Novogrip clamping lever M10x15
1x reinforcing angle 34x25x2
1x clamping board 30 x 8, length 34 mm
1x high-performance lubricant, white, approx. 5 g

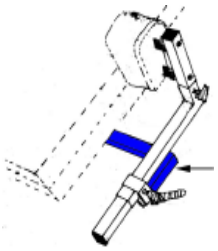
2018111-125 SPARE EBIKE EL HIP SUPPORT COMPLETE

Service Kit: Hip cushion, grey (eBike EL only)
1x hip cushion, grey, mounted on support
1x star knob

2018111-126 SPARE EBIKE EL HIP CUSHION SINGLE

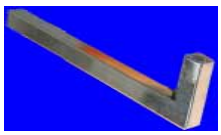
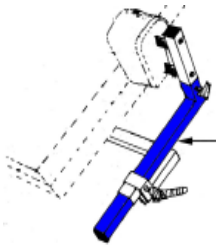
Service Kit: Hip cushion, grey (eBike EL only) comprising:
1x hip cushion, grey
2x screw

2018111-127 SPARE EBIKE EL GUIDE TUBE HIP SUPPORT



Service Kit: Guide tube hip cushion (eBike EL only) comprising:
1x guide tube hip support (see arrow in sketch)
2x clamping plate 30x8, length 34
2x reinforcing angle 34x25x2
2x Novogrip clamping lever M10x15
1x retaining screw M8x20

2018111-128 SPARE EBIKE EL FIX TUBE HIP SUPPORT

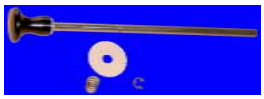
Service Kit: support tubing hip support (eBike EL only) comprising:
1x support tubing hip support (see arrow in sketch)
1x Novogrip clamping lever M10 x 15
1x reinforcing angle 34 x 25 x 2
1x clamping board 30 x 8, length 34 mm
1x high-performance lubricant, white, approx. 5 g
1x star knob M8x20

2018111-129 SPARE EBIKE L COUCH CUSHION

Service Kit: Upholstery couch surface, grey, for eBike L, comprising:
1x upholstery couch cushion, grey, for eBike L
6x screw M5x60

2018111-130 SPARE EBIKE EL COUCH CUSHION

Service Kit: Upholstery couch surface, grey, for eBike EL, comprising:
1x upholstery couch cushion, grey, for eBike EL
5x screw M5x60

Part No.	Short Description	Description
2018111-131	**SPARE EBIKE EL DROP SECTION COMPLETE**	**Service Kit: Drop section, complete with holder (eBike EL only), comprising:** 1x drop section, complete with holder (eBike EL only) 1x retaining screw M8x20
2018111-132	**SPARE EBIKE EL DROP CUSHION SINGLE**	**Service Kit: Drop cushion, grey (eBike EL only) comprising:** 1x drop cushion, grey 4x screw M6x50
2018111-133	**SPARE EBIKE EL LOCK FOR DROP SECTION** 	**Service Kit: Lock for drop section, comprising:** 1x lock for drop section 1x installation material kit
Service Kits ebike L / eBike EL, miscellaneous		
2018111-134	**SPARE EBIKE L&EL SUPPORT FOR CALIBRATION**	**Service Kit: Device Support for Calibration:** 1 x calibration stay 2 x calibration support
2018111-135	**SPARE EBIKE L&EL CALIBRATION WEIGHT 8KG**	**Service Kit: Calibration Weight:** 1 x weight (8 kg) 1 x hook
Documentation		
2018112-003	MNL SVCE EBIKE	Servicing Instructions eBike English

For your notes

Appendix C.1: Technical Specifications eBike Basic / eBike Comfort

Ergometer Model:	modular ergometer system eBike,
	models eBike basic, eBike comfort
operating mode:	continuous operation
power:	100 - 240 V / 50 - 60 Hz
power consumption:	60 VA max.
fuses:	2 x 1.25 A (slow-blow)
braking principle:	computer-controlled eddy-current brake with torque measurement; speed (RPM)-independent to DIN VDE 0750-0238
load range:	6 . . . 999 Watt, speed (RPM)-independent
RPM range:	30 . . . 130 n/min
deviation of load	to DIN VDE 0750-0238: +/- 5% max. between 25 and 400 Watts
	but +/- 3 W max. between 25 and 100 Watts
	acc. to manufacturer: +/- 5% max. between 20 and 999 Watts but +/- 3 W max. between 6 and 100 Watts
load levels:	manual change by 1, 5, 10 or 25 W or multiples thereof through protocol
implemented protocols:	
with control terminal PC:	exercise tests: 5 fixed protocols (WHO, Hollmann and others)
	10 user-programmable protocols
	manual load control
with control terminal PCplus:	exercise tests: 5 fixed protocols (WHO, Hollmann and others)
	10 user-programmable protocols
	manual load control
permitted patient weight:	150 kg
saddle height adjustment:	continuous for heights between 120 cm and 210 cm
	digital indication of saddle height
eBike basic:	manual adjustment of saddle height
eBike comfort:	software-controlled electrical adjustment of saddle height
adjustment of the handlebar:	for heights between 120 cm and 210 cm
eBike basic:	rigid steering column, continuous, full-circle (360°) handlebar adjustment
eBike comfort:	height adjustment of steering column, continuous, full-circle (360°) handlebar adjustment
displays:	LCD as well as LED as an additional speed (RPM) indication
with control terminal PC:	LCD: 68 x 34 mm and 128 x 64 pixel, respectively
with control terminal PCplus:	LCD: 115 x 88 mm and 320 x 240 pixel, respectively
interfaces:	PORT 1: RS232 with remote start, 9-pin Sub-D
	PORT 2: RS232, 9-pin Sub-D, for service purposes only
	PORT 3: RS232, 5-pin DIN socket
	ANALOG: analog input/output for nominal load, 8-pin DIN socket
	remote start EKG unit (starting pulse for EKG unit); 1 to 30 seconds before load change
weight:	
eBike basic:	approx. 61 kg
eBike comfort:	approx. 69 kg
dimensions (W x L):	460 x 900 mm, width of handlebar: approx. 575 mm
height:	minimum: approx. 900 mm; maximum: approx. 1350 mm
calibration:	software-controlled via keyboard / PC with standard calibration weight of 8 kg
calibration protection:	code

safety standards:	BF to IEC 60601-1
protection class:	I to IEC 60-601
MDD classification:	class IIa to 93/42 EEC

Environment:

operation:	temperature: +10...+40 °C/50...104 °F
relative humidity	30 ... 75%, 90% no condensation
atmospheric pressure:	700 ... 1060 hPa
transport and storage:	temperature: -40 ... +70 °C (-40 ... +158 °F)
relative humidity:	10 ... 95%, no condensation
atmospheric pressure:	500 ... 1060 hPa

Optional: BP Module

measuring principle:	- indirect measurement to Riva-Rocci-Korotkov
	- oscillometric
	the resting BP readings of both methods are compared for plausibility
cuff connection:	tubing with connector and jack plug (microphone)
measuring range:	
systolic pressure:	40 to 300 mmHg
diastolic pressure:	40 to 300 mmHg
pulse:	35 to 230 P/min
accuracy of the (static)	
pressure readout:	+/-3 mmHg
resolution of the readout:	+/- 1 mmHg
initial inflation pressure	during the inflation phase, the inflation pressure automatically adapts to patient's BP
pump rate:	between approx. 6 seconds (to 140 mmHg) and approx. 18 seconds (to 300 mmHg)
max. cuff pressure:	300 mmHg
cuff deflation method:	pulse-dependent deflation rate
	approx. 3 mmHg/beat or approx. 3 mmHg/s
calibration:	calibration with external pressure meter
artefact rejection:	automatic artifact rejection and comparison of the resting BP readings of both methods for plausibility

Appendix C.2: Technical Specifications eBike L

Ergometer Model

– modular ergometer system eBike L

Operating Mode

– continuous operation

Power Supply

– 230 V / 50 Hz or 115 V / 60 Hz

Power Consumption

– 205 VA max.

Instrument Fuses

– 230V = 2 x 2 A slow-blow or 115 V = 2 x 3 A slow-blow

Braking Principle

– computer-controlled eddy current brake with torque measurement; speed independent to DIN VDE 0750-0238

Load Range

– 6 ... 999 Watt, speed (RPM)-independent

RPM Range

– 30 ... 130 n/min

Load Error

– to DIN VDE 0750-0238
  ± 5 % max. between 25 and 400 W and ± 3 W max. between 25 and 100 W
– acc. to manufacturer: +/- 5% max. between 20 and 900 Watts and +/-3 watts max. between 6 and 100 watts

Load Increments

– configurable: 1, 5, 10 or 25 W

Internal Protocols

– 5 fixed protocols, 10 user-configurable protocols

Patient Weight

– 160 kg max.

Saddle Height Adjustment

– motor-driven, continuous adjustment for heights between 120 cm and 210 cm

Handgrip Adjustment

- continuous

Crank Length

– 170 mm

Display

– 115 x 88 mm, 320 x 240 pixels

Interfaces

– 2 x RS232: 9-pin Sub-D
– 1 x RS232: 5-pin DIN socket
– analog input for target load: 8-pin DIN socket
– analog output for current load: 8-pin DIN socket
– remote start EKG unit: 1 ... 30 s before load change

Environment

Operation

– temperature between +10 and +40 °C (50 and 104 °F)
– relative humidity 30 to 75 %, no condensation
– atmospheric pressure 700 to 1060 hPa

Transport and Storage

– temperature between -40 and + 70 °C (-40 and 158 °F)
– relative humidity between 10 and 95 %, no condensation
– atmospheric pressure 500 to 1060 hPa

Dimensions and Weight

dimensions (W x L):

- min.: 800 x 2350 mm (tilted 45°, head rest in bottom position);
- max.: 800 x 2520 mm (tiltet 0°, head rest in top position);

– weight approx. **110** kg

Blood-Pressure Module

Measuring Principle

– auscultatory method, oscillometric method; for resting BP, the results from both measurements are compared for plausibility

Measuring Range

– systolic pressure: 40 ... 300 mmHg
– diastolic pressure: 40 ... 300 mmHg
– pulse rate: 35 ... 230 B/min

Measuring Error

– pressure readout error: ± 3 mmHg
– readout resolution: ± 1 mm Hg

Inflation Pressure

– 300 mmHg max., adapts automatically to systolic pressure

Inflation Rate

– 6 s to 140 mmHg; 18 s to 300 mmHg

Max. Cuff Pressure

– 300 mmHg

Deflation Rate

– pulse-dependent deflation rate, approx. 3 mmHg/pulse or 3 mmHg/s

Calibration

– with external pressure meter

Artefact Rejection

– automatic artifact rejection and comparison of the resting BP readings of both methods for plausibility

Appendix C.3: Technical Specifications eBike EL

Ergometer Model

– modular ergometer system eBike EL

Operating Mode

– continuous operation

Power Supply

– 230 V / 50 Hz or 115 V / 60 Hz

Power Consumption

– 205 VA max.

Instrument Fuses

– 230V = 2 x 2 A slow-blow or 115 V = 2 x 3 A slow-blow

Braking Principle

– computer-controlled eddy current brake with torque measurement; speed independent to DIN VDE 0750-0238

Load Range

– 6 ... 999 Watt, speed (RPM)-independent

RPM Range

– 30 ... 130 n/min

Load Error

– to DIN VDE 0750-0238
  ± 5 % max. between 25 and 400 W and ± 3 W max. between 25 and 100 W
– acc. to manufacturer: +/- 5% max. between 20 and 900 Watts and +/-3 watts max. between 6 and 100 watts

Load Increments

– configurable: 1, 5, 10 or 25 W

Internal Protocols

– 5 fixed protocols, 10 user-configurable protocols

Patient Weight

– 140 kg max.

Saddle Height Adjustment

– motor-driven, continuous adjustment for heights between 120 cm and 210 cm

Handgrip Adjustment

- continuous
- swivel range: motor-driven 0° - 45°

Crank Length

– 170 mm

Display

– 115 x 88 mm, 320 x 240 pixels

Interfaces

– 2 x RS232: 9-pin Sub-D
– 1 x RS232: 5-pin DIN socket
– analog input for target load: 8-pin DIN socket
– analog output for current load: 8-pin DIN socket
– remote start EKG unit: 1 ... 30 s before load change

Environment

Operation

– temperature between +10 and +40 °C (50 and 104 °F)
– relative humidity 30 to 75 %, no condensation
– atmospheric pressure 700 to 1060 hPa

Transport and Storage

– temperature between -40 and + 70 °C (-40 and 158 °F)
– relative humidity between 10 and 95 %, no condensation
– atmospheric pressure 500 to 1060 hPa

Dimensions and Weight

dimensions (W x L):

– min.: 800 x 2100 mm (head rest in bottom position);
– max.:1200 x 2600 mm (tilted 45°, head rest in top position);
– weight approx. 140 kg

Blood-Pressure Module

Measuring Principle

– auscultatory method, oscillometric method; for resting BP, the results from both measurements are compared for plausibility

Measuring Range

– systolic pressure: 40 ... 300 mmHg
– diastolic pressure: 40 ... 300 mmHg
– pulse rate: 35 ... 230 B/min

Measuring Error

– pressure readout error: ± 3 mmHg
– readout resolution: ± 1 mm Hg

Inflation Pressure

– 300 mmHg max., adapts automatically to systolic pressure

Inflation Rate

– 6 s to 140 mmHg; 18 s to 300 mmHg

Max. Cuff Pressure

– 300 mmHg

Deflation Rate

– pulse-dependent deflation rate, approx. 3 mmHg/pulse or 3 mmHg/s

Calibration

– with external pressure meter

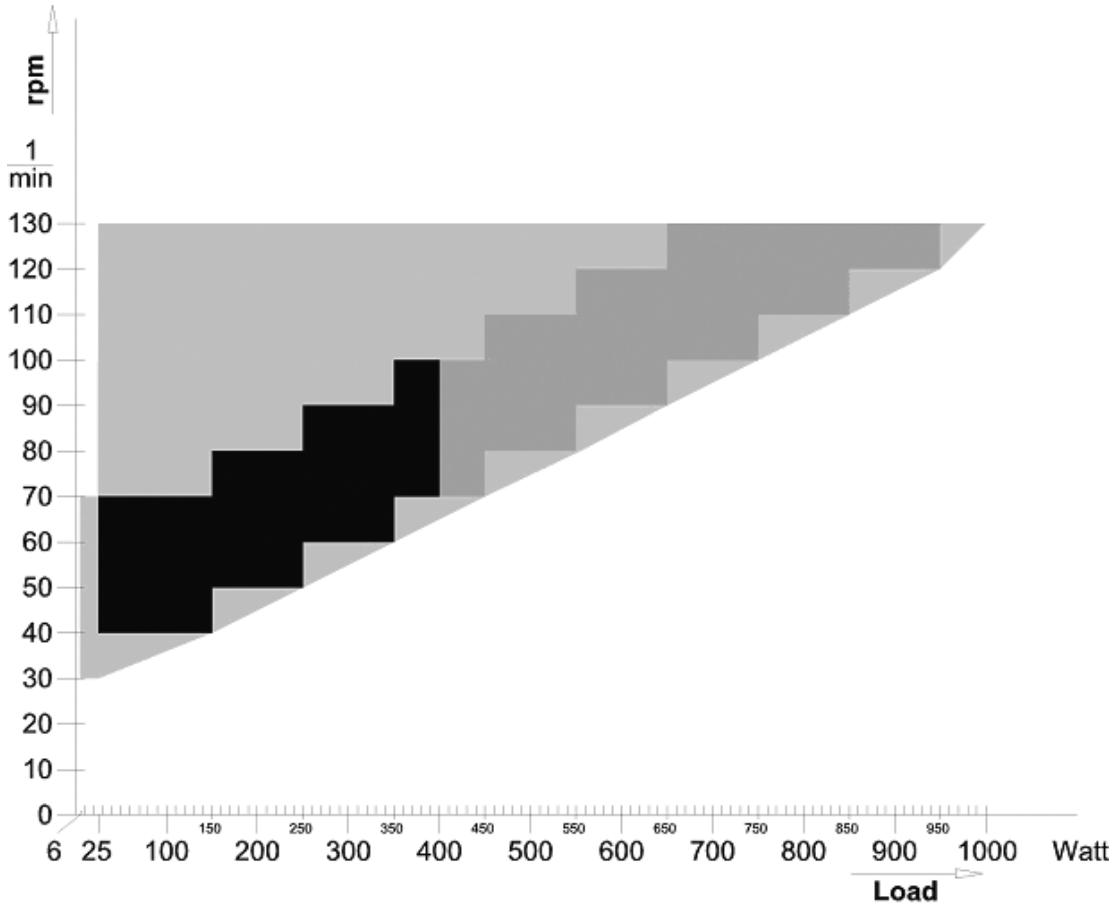
Artefact Rejection

– automatic artifact rejection and comparison of the resting BP readings of both methods for plausibility

Family of characteristics of the braking torque control range „eBike system“

speed-independent range to DIN VDE 0750-0238

\+ speed-independent range, eBike system



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